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Office Management

The Magazine for Management Executives

Trends and Forecast Issue

January **1960**

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Office Management

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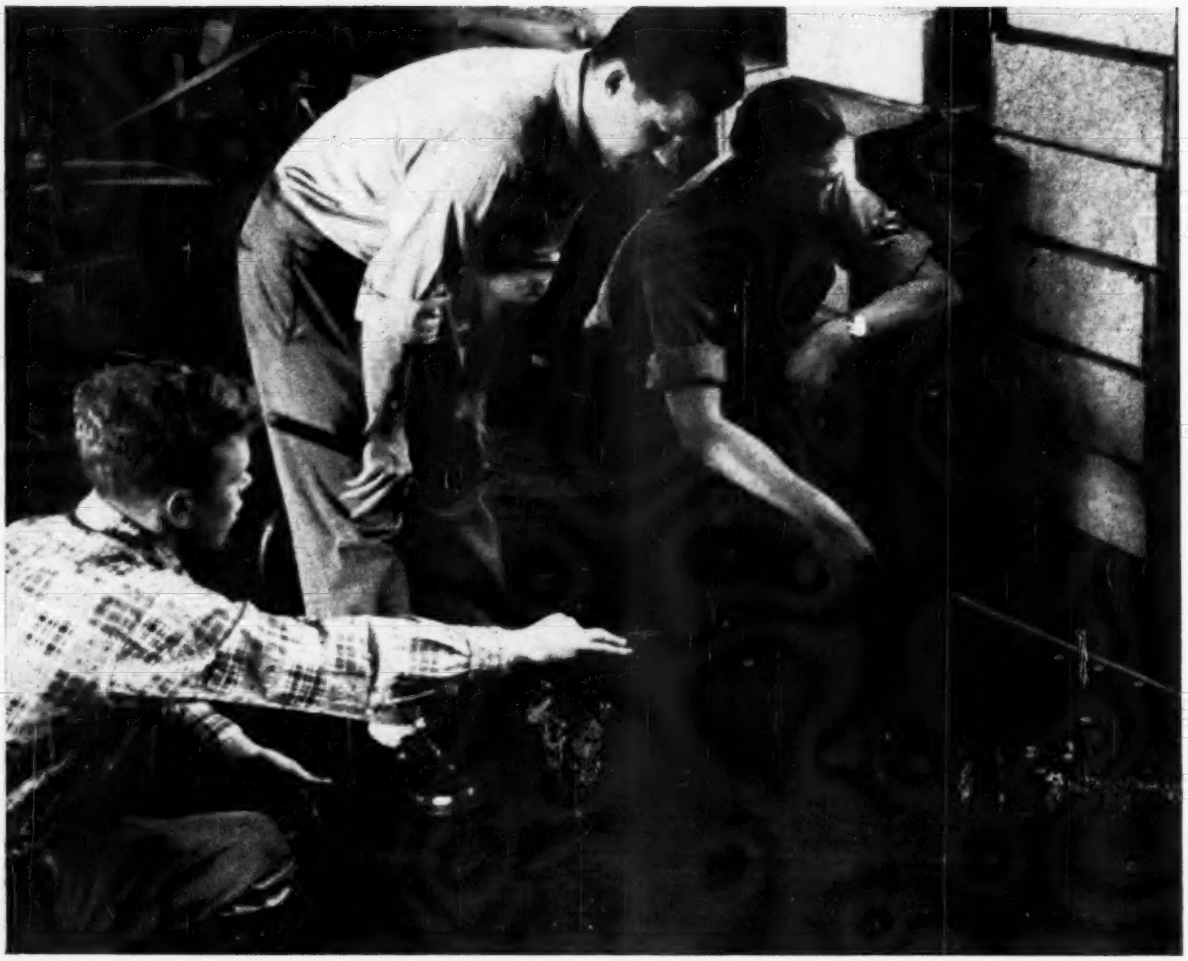

Imagine the odds management is bucking!

No, you can't blame the men. They clocked in at eight this morning – but, as yet, the work hasn't reached their department. Pitching pennies at least passes the time. But you can bet that game of theirs will show up in the company's P and L!

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NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION

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MANAGEMENT'S ROLE IN THE SIXTIES

Required: A rise in gross national product with a simultaneous drop in costs. Conditions: A tight labor market, more emphasis on leisure. That's management's challenge in the years ahead—

THE FIFTIES was a decade in which Americans became familiar with automation, space satellites and the Diner's Club.

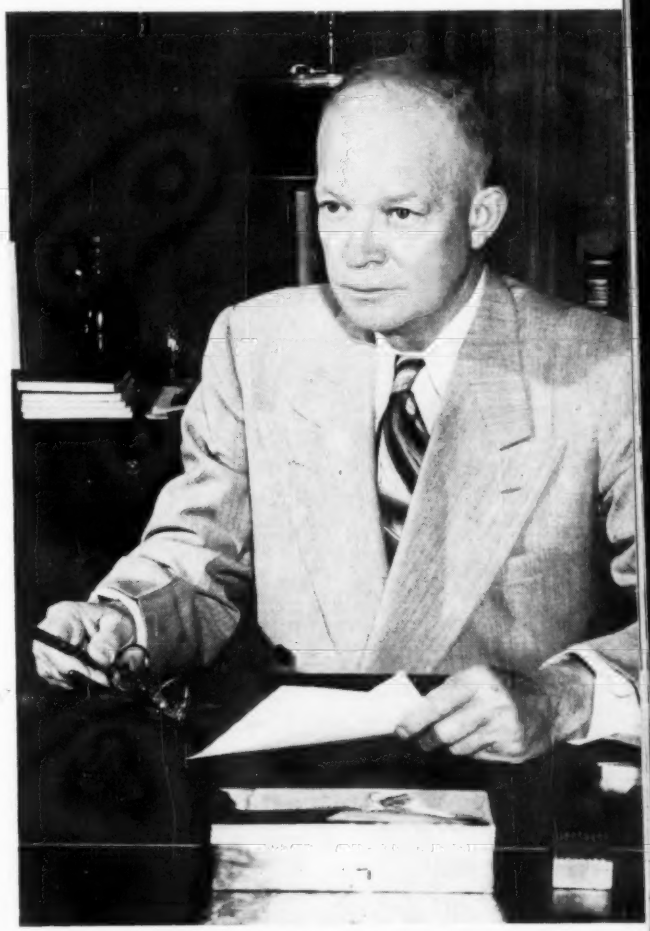
Their everyday vocabularies became enriched with words such as:

Split-level.
Acrilan.
Tail-fin.
Salk vaccine.
Shopping center.
Turboglide.
Rock 'n roll.
Wash-and-wear.
Vistavision.
Fifth amendment.
Brinkmanship.
Filter tips.
Nasserism; McCarthyism.
Hi-fi; hula hoops.
Payola; mutual funds.
The Summit.
The exploding population.
And ileitis.

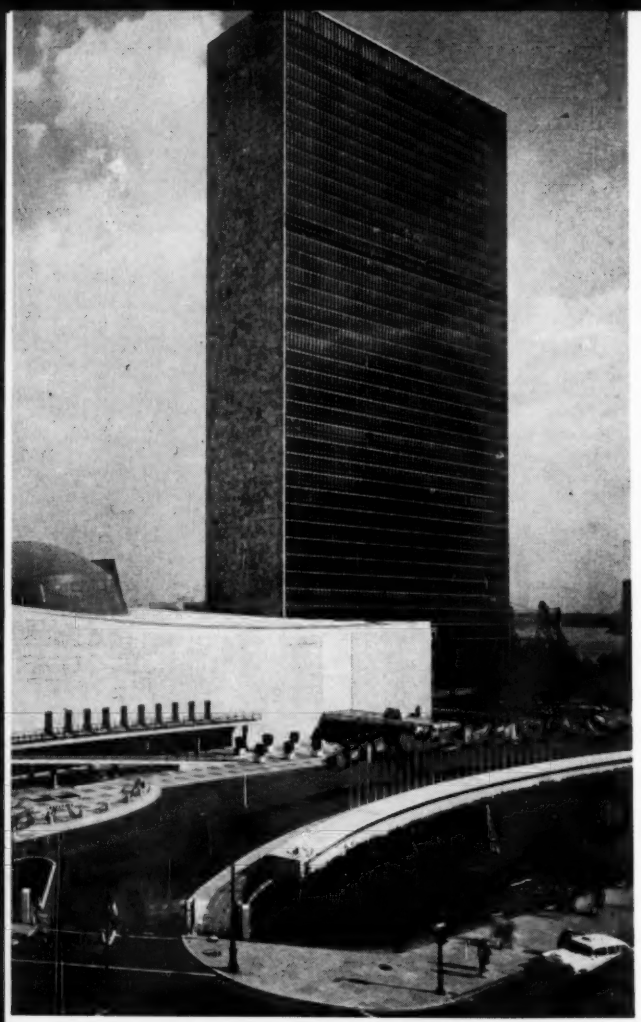
Office executives learned list after list of new terms, too—the scientific, almost futuristic jargon of mid-century management.

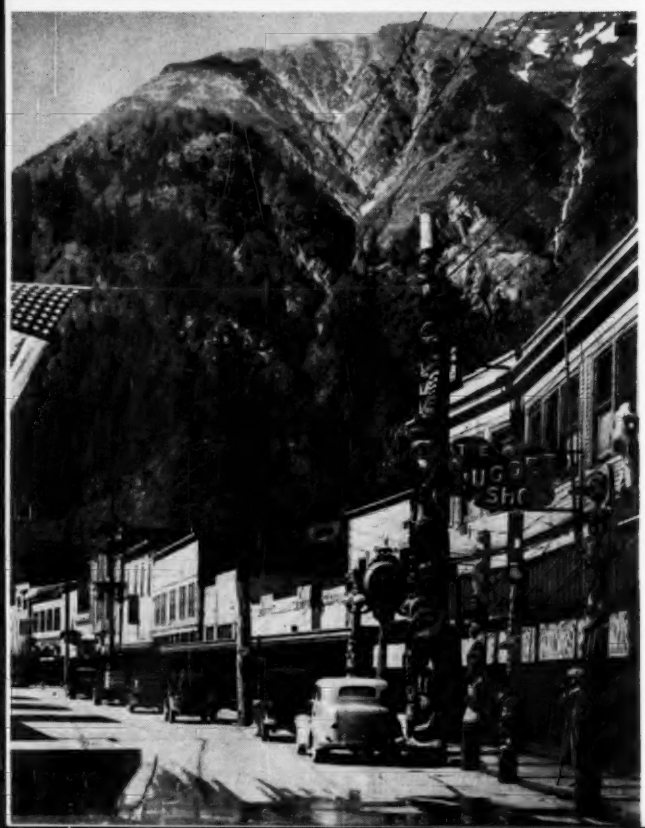
There was Electronics with all its sesquipedalian offspring. There was Integrated Data Processing with its special language. There were Fully Transistorized Systems, "Total" Systems, Closed Circuit Television, Binary Numbers, Intrafax, Thermofax, and Verifax.

All these things—the sputniks, the credit cards, the "mechanical brains" and the rest—are symbols and symptoms of the great forces that shaped the fifties, and that project their ineradicable image on the young and hopeful sixties.



His successor will face new problems of peace and production.





The U. N. kept an uneasy peace in the world. . . .

The fifties ushered the world into the Space Age, and started it on its teen years in the Nuclear Age. All seriously thinking mankind, at the close of the fifties, could feel itself on the verge of great discoveries, great adventures, great miracles almost, in a new Golden Age that seemed almost within its grasp.

The U.S.—and the World

The fates of the fifties decreed that the United States of America—stronger and richer than ever in its history—was to lead the world through these swiftly moving times. It was not to be a leadership by dictation or threat, but more a leadership of inspiration and magnanimity, grounded in the spirit of personal freedom and material progress which had been America's heritage from the start.

In large measure, under the leadership of the decade's two Presidents, America faced up to the role the fates had assigned. It shared its goods, at a cost of billions, with peoples of all continents. At a cost of thousands of human lives and additional billions of dollars, it defended, under a United Nations banner, the independence of South Korea. It proposed to share its nuclear know-how with the world for the material improvement of all its masses.

But at times the United States angered the fates with what seemed to be its lethargic unwillingness to provide the leadership, the vision, if you will, of a promising destiny that the world demanded.

It watched as whole peoples fell under the sway of a communistic adversary—a cunning adversary whose growing strength stemmed partly from the coercive efficiencies of a totalitarian regime, but partly also from the curious, zealous conviction of its subjects that "history was on their side," that their way was the way to a materialistic Eden whose delights they would someday savor.

The United States, which entered the decade with unparalleled strength, departed from the fifties a weakened second-best in missiles and rocketry. Its arsenals, of course, still held the awful fury of the hydrogen bomb, but so did the Soviet Union's.

. . . and the U. S. added two new states

These mighty stockpiles—laboriously amassed and jealously guarded by the two antagonistic superpowers—bequeathed to the sixties one of history's most profound, unanswered questions:

Would there be war of almost total destruction, or would the fear of mutual annihilation be the safeguard against annihilation and the foundation of a stable peace?

It is a question which, in all likelihood, the sixties will not bequeath to the seventies—at least not in that form. It is a question which the sixties must answer for itself. The answer to it affects every man, woman and child on earth—obviously. But in several special ways it will affect management, not only directly (in the very immediate reactions to the alternatives, *war* or *peace*), but indirectly in the crucial time *before* the answer is rendered with any finality. Indeed, the conduct of American management in these momentous years will help to shape the answer for good or ill. It will help to determine whether the United States can weather the storms of the sixties—whether they be the radioactive whirlwinds of war, or the erosive simoons of peaceful economic coexistence.

War—total, fierce, holocaustal nuclear war—is a tragically real possibility for our times. Some pessimistic observers (widely quoted recently, not by name but by reputation as knowledgeable sources of gov-

Sleek new office buildings rose in every part of our cities

We must build strength not only in arms, but in our commercial and industrial sinews

ernmental information) say it is actually the more likely possibility. According to their reasoning, the Soviet Union would not hesitate to launch all-out atomic warfare if it saw a chance of victory and world domination. While the Russians would undoubtedly suffer great losses from retaliatory attacks (this reasoning goes), they would inflict far greater damage upon the United States, for their attacks would come sooner and more suddenly. Neither country would be "totally" destroyed, only very badly destroyed.

This new way of seeing any future war—not as mass suicide, but as great-but-finite devastation—is one of the reasons war may come about, according to people who see war as likely. The public is slowly adjusting its attitude toward war: away from an emotional outlook which finds war too horrible to contemplate, and toward an outlook which still finds war horrible but a possibility to contend with rationally.

Arms gap increases danger

A more concrete reason for believing war may come, however, lies in the gaps between our level of arms development — particularly missile development — as compared with the Soviet Union. The gaps, to be sure, are subjects of heated conjecture, and honest minds will differ over whether they are widening, shrinking, or really even matter. But no one denies that they exist. And the simple fact that, in certain respects, we are less capable than our adversaries seems reason enough for uneasiness.

One major challenge this poses for management as it enters the anxious sixties, is to find new ways to bolster national strength. This involves greater strength, not only in arms, but in the commercial, industrial and social sinews which make up the muscle of American power. It refers not merely to *more* things, or *more* production, but production at a rate of growth higher than the one we tolerated in the fifties.

To accomplish this—both privately and governmentally—will mean that management must function on new levels of efficiency. If the missile gap is not to be overshadowed by a greater danger—the management gap—American executives must prepare to direct their organizations through a decade that will see new, daring applications of automation; realistic, efficient realignments of corporate structure; new attitudes toward labor and to the individuals who compose the work force; new attitudes on the part of labor; tougher competition as a trend toward organizational "bigness" squeezes smaller companies into a thinner margin for survival.

Moreover, these are the challenges and the trends which management will face whether the sixties lead to war, or, as *Office Management* thinks, to an edgy but enduring "peace". This alternative, indeed, will

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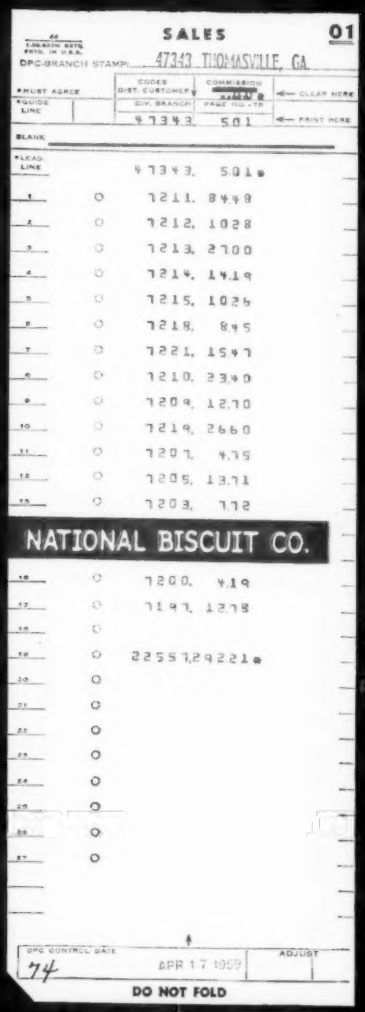

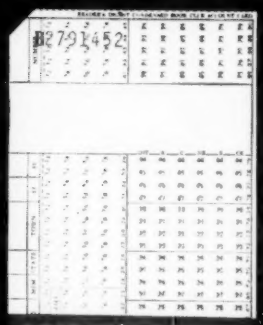

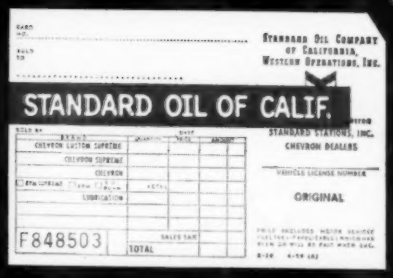

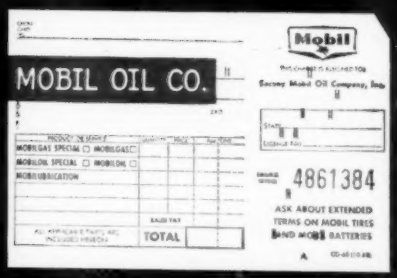

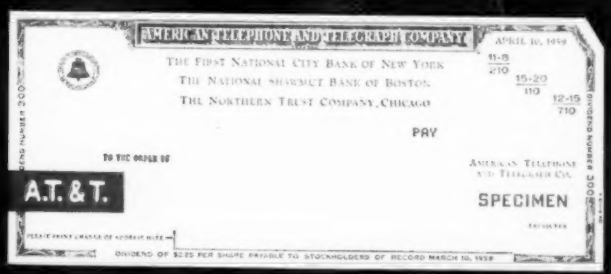
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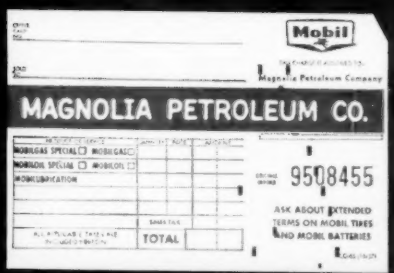

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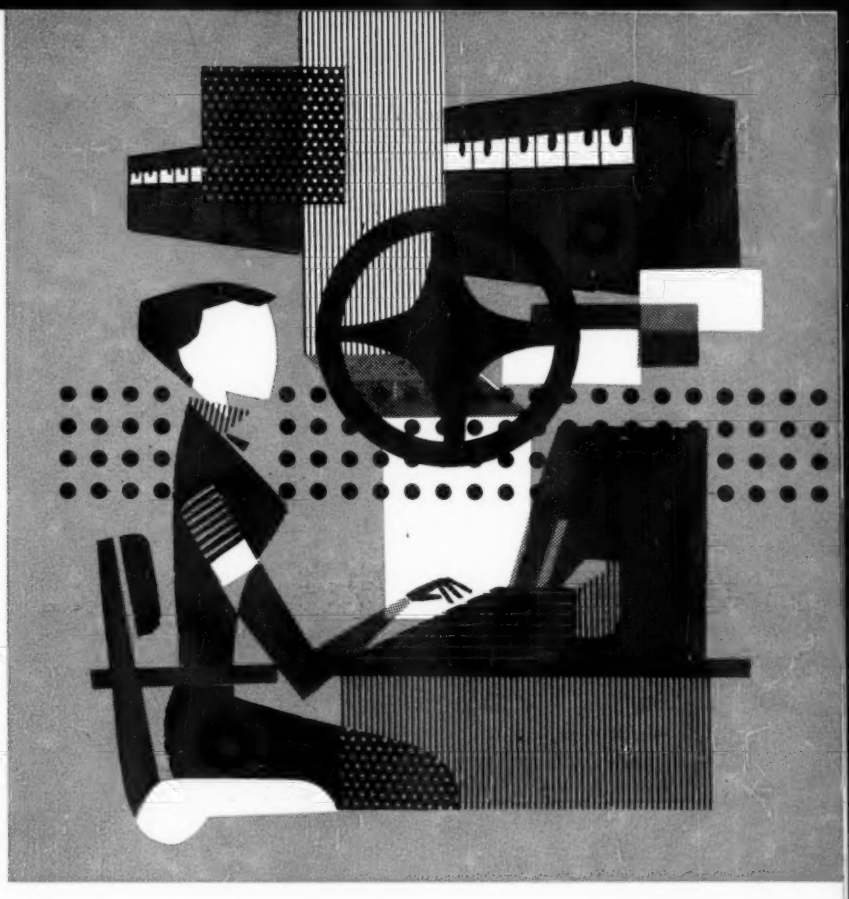
impose even graver responsibilities upon the leaders of American business, because this peace will not come cheaply. It will be peace in a combatant sense only—with no relaxation, but rather a fervent intensification of the competition for the allegiance of the world's peoples.

Neither taxes nor inflation's slow rise can be expected to abate in the sixties. Nor will wages be kept high only by the cost of living but also by the more fundamental reason of a chronically inadequate supply of workers as the complexity of business increases. Meanwhile, employees, indoctrinated to the new Cult of Leisure, able to afford some of the accouterments of a better life (and dreaming of a still easier one), will demand in offices all the creature comforts, all the plush, glamour and recreation rooms and coffee breaks that they're "entitled to."

All economic indicators point to thriving business in the sixties — with goods and services expected to total over a half-trillion dollars this year alone. So if overhead will grow — and it will! — profits will, too. The question for management to ponder is which will grow faster. Some of the old measuring devices used in the fifties to answer such questions may not work too well in the future. New tax approaches, for one thing, may prevent some of the "glamour" from rating the same generous write-offs it enjoyed before. Some of the sacrifices in profit which companies may have to accept, to meet the prices of foreign competition, might be another.

In short, the top management executive, as he enters the sixties, needs a wizardry and a wisdom surpassing anything he has required before. He has demonstrated already, the spellbinding magic of automation, and the feats (once thought "impossible") which this electronic god performs at his beckoning. But the manager, faced with the multiplicity of problems outlined so briefly above, must now add to his act the nimbleness of a juggler, to balance and reconcile the problems of growth-rate, wage-rates, fluctuating markets, foreign competition, tariffs, downtown blight, and the hundreds of other worries which will bedevil him in no certain order or degree. And above all, he must have the profound wisdom to guide his organization, composed of hundreds if not thousands of individuals, in a way that upholds their dignity as free people — people threatened, perhaps, by a totalitarian competitor, but resolved not to adopt his ways in order to outreach him.



AUTOMATION
IN THE OFFICE

As the sixties open, management prepares for the Automated Decade with many bold expansion plans. Gone now is much of the caution that gripped companies during the recession; in its place, a vital confidence in management's ability to streamline operations, solve problems, grow. Automation still raises problems of its own, of course. Some of these problems — and their solutions — are discussed in this section.

"TOTAL" INTEGRATION THROUGH AUTOMATION FORESEEN AS MAJOR ADVANCE OF SIXTIES

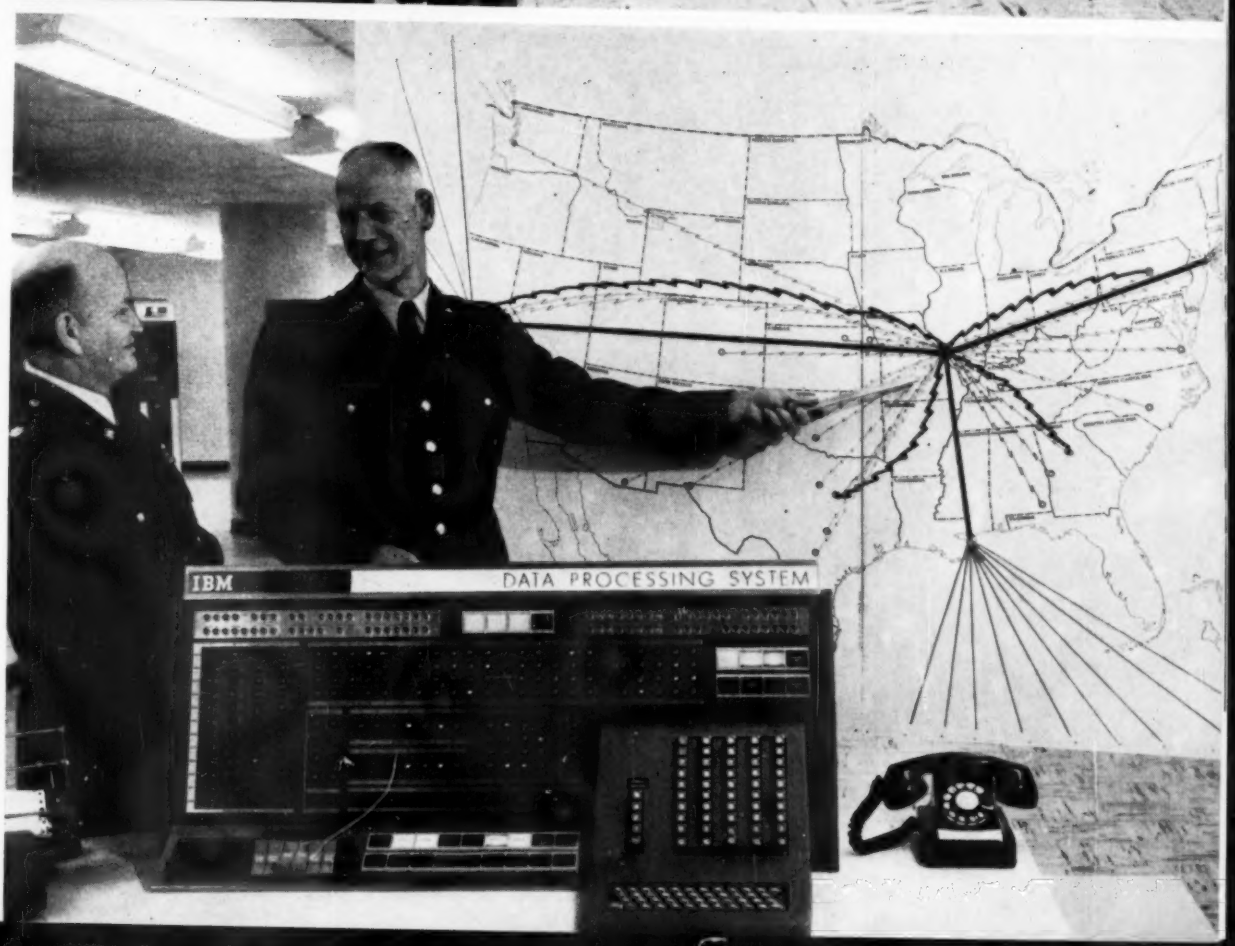
But effect on personnel could become major management problem

By ROBERT M. SMITH

DURING the fifties, each year brought spectacular advances in the "hardware" of automation – and new problems in the application of the machines and the implications of automation itself. The major problem facing business in the sixties—and to a certain degree, the whole economic fabric—is to bring the forces back in balance, to insure that systems and personnel adjustments in the rapidly changing business picture keep pace with technological advances.

Today, we have giant computers being used in many companies to duplicate the work that was being done ten years ago by clerks with manual methods. Despite the stress that has been placed on the need for systems revision before installation of electronic data processors, too many companies have scamped the job, and too many others have interpreted systems revision as a general streamlining of conventional methods, and

New centralized inventory control system of Army's Transportation Material Command illustrates graphically clerical reduction possible through automation. Top: Clerk enters punched cards transmitted automatically from all parts of the world into reader which will translate card information into magnetic tape. Bottom: (left to right) Lt. Col. Wallace R. Elliott, Director Automatic Data Processing, and Brig. Gen. William R. Bunker, Commanding General, TMC, at console control of processing system.


IBM
DATA PROCESSING SYSTEM

Business has fallen behind in assessing—

and planning for—the psychological effects of automation

adaptation of a few new procedures to allow the computer installation to function. It is still the comparatively rare company that looks at the computer's innate abilities, and its potential for eliminating entire conventional paperwork areas. And the number of companies that have seen the possibilities of the computer as a regulating mechanism for all phases of the company—production, sales, administration—is still smaller.

Business has also fallen behind generally in assessing and planning for the psychological effects of automation, either on the production line or in the office. While most instances of clerical automation have included provisions for transfer of displaced workers to other parts of the company, and some planned information program in advance of the change, all the ramifications of intelligent transfer have not by any means been fully worked out. For example, how many companies have really faced the problem of what to do with senior workers suddenly moved into a new area where, in spite of their years of service, they have less experience than their juniors? How many have considered the psychological problems involved in moving a worker with a relatively responsible job, even while his salary level is maintained, into a less demanding position?

Vital facts for management decision are held in these tape reels.

Relatively few. And some major concerns have mishandled the whole problem completely—have given little or no official advance warning even when their plans to install a computer were fairly far advanced. They thus allowed all kinds of wild rumors to gain ground with a resultant drop in morale, production, and the inevitable result that the best and most able workers began to look around for new jobs with more security.

No breathing space in sight

And these things happened during the past ten years when the most progressive and wealthiest companies were the ones that pioneered in the automation of office work routines. During the years ahead, unless some hard and productive thinking is done by everyone in management, we can expect to see these problems multiply as more and more concerns begin to investigate the possibilities of automation for their procedures.

Nor will there be any breathing space while business assimilates the machines that have been developed, and works out the best ways to use them, and how to prepare employees for them. The technological advances continue, and with the increasing pace of competition between both domestic and foreign manufacturers, they can be expected to come even faster during the next ten years than they have during the past.

Here are some of the advances anticipated by John Diebold, founder and president of John Diebold & Associates, Inc., an organization specializing in automation:

Wide extention of remote "sending stations" in industrial facilities permitting individual workers to key in information on small machines which will be automatically transmitted to receiving machines at a central computer installation. Information keyed in by the worker will be received in punched card form at the central installation, thus permitting rapid conversion to magnetic tape for computer input and automatic updating of production records.

Within a few years, Diebold prophesies, it will be possible to eliminate the punched card state altogether, and have direct tape-to-tape transmission to carry individual production statistics to a central computing unit.

Before the end of the decade, he believes, such units will be two-way: it will not only be possible to send information directly to a central computing unit, but it will be possible for remote locations employing leased wires to request information directly from the computer memory. (*To page* 19)

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Can management master the new developments?

He also foresees many new applications of magnetic ink character recognition, now being applied by banks for check processing. (Already Bell Telephone Laboratories has developed a machine which can read human handwriting to the extent of the ten digits.)

Shortly after the middle of the sixties, according to Diebold, it will be possible to give verbal directions to a computer, which will translate the voice sounds into its own internal language, and carry out the directions given.

Significant advances in computers themselves, already embodied in some machines, will make it possible for the central unit to work on a number of different programs simultaneously, or at least at high enough speeds so the effect is one of simultaneous processing. Thus, the comparatively low speed of input and output equipment for the central computer in terms of the computer's processing speed will be offset simply by linking a greater number of input and output units to the central mathematical and memory units, and carrying on a number of programs at the same time.

These are some of the developments that are to be expected in the year ahead—some of them are with us already in some machines. The question is: can management, which is today so often lagging behind in making full use of the computer abilities now available, master these new developments and take full advantage of them as they come along?

Some of the difficulties that have arisen in the past will be eased by the fact that computers both large and small, are becoming far more flexible, so that an entire staff layer of technicians, programmers, and coders will no longer have to be built to translate management needs into terms the computer can understand. The rapid developments in automatic programming and the recent government pressure for all computer manufacturers to agree on a "common language" for machines will go far to eliminate the need for coders, and, as the possibility of directing computer operations through simple English instructions increases, will tend to make the programmer himself superfluous.

Programming difficulties easing

This is true, particularly, of the big computers which have accomplished so much, but which have also meant so many changes and caused so much upheaval in many companies. Now, with scanning devices being built into computers so that the machines themselves can check over their instructions, strike out redundancies and duplications of efforts, and evolve the shortest and simplest methods of achieving management's desired goals, the need for an entire group of technical personnel between operating management and the capacities of the machines is being steadily lessened.

By the same token, the smaller automatic data

Small computers are comparatively easy to program

processors, even though they are not equipped to accept instructions in simple English sentences, are comparatively easy to program. Therefore with relatively little instruction a variety of people on the existing staff can be taught to use the computer to solve problems.

The whole question of large vs. small computers will be one of the liveliest issues of the sixties. The growing competition between IBM and RCA to establish service centers across the nation will make it possible for many small companies, which previously could not even think in terms of a large computer, to lease time for their routine data processing applications on a regular basis at some point not too far distant from their company headquarters. By means of leased wires, they can tie in to the center, just as scattered company locations can to a central computer point, and automatically transmit data for processing on a regular basis. The argument here is that the low unit cost for each item processed on a large computer makes it economical for the small company, even if it only rents an hour or so a month, to make use of the great speed of the central processor.

On the other hand, manufacturers of small computers maintain their machines can meet most of the needs of the small company as adequately as a large computer, even though their memory capacity is smaller and their operating speed lower. A small company presumably does not need such a large memory capacity as a giant concern, nor does it require such high processing speeds, since the number of items of information it must deal with is less than is the case with the giant corporation. Thus, a small company which only had a few thousand items of information to deal with daily could update its records, and adjust its operating information for management just as rapidly with a small computer as a giant concern could with a large one. Moreover, the companies concentrating on small computers point out a small company can afford to buy one of their machines for its own premises, which means that the machine is available for other than its routine data processing uses—can be employed easily for "one shot" applications, in other words.

Many small computers serve dual function

This freedom becomes even more important since many of the new, small computers can be used for both clerical and engineering, or scientific work.

Moreover, the fast developing field of high speed information retrieval in the form of graphic images

(*To page* 51)

1950-1960 advances symbolized by—

THREE AUTOMATION MILESTONES OF THE PAST DECADE

An *Office Management* Staff Report

IN THE history of the rapid spread of office automation during the 1950's, three major events stand out almost as markers in the progress made during the decade.

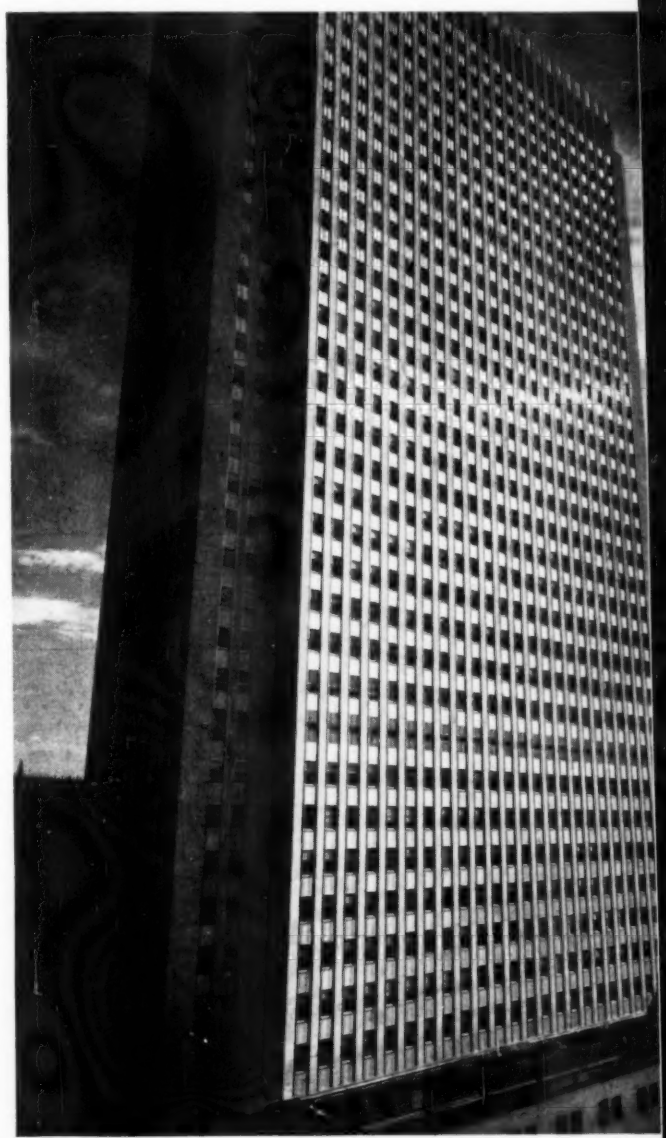
The first: the first public statement of the integrated data processing concept, presented by systems personnel of the United States Steel Corp., at an historic American Management Association conference in New York in February, 1954.

The second: the opening by Sylvania Electric Products Corp., at Camillus, New York, of the first electronic data processing center specifically established to serve the national data processing needs of a major American company.

And the third: the Carborundum Company's "total system" approach to clerical work in the development of its data processing center at Niagara Falls, N. Y.

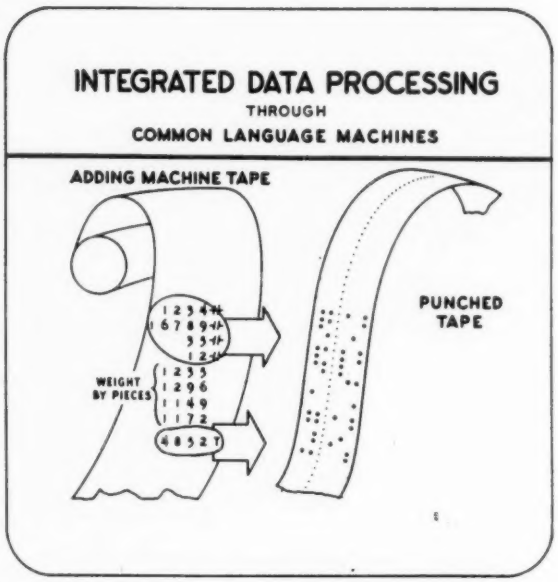
Together, the three events span the decade, and each represents in its way a milestone in the history of office automation during that decade. To review them each, and their significance to office automation as we know it today, and as we can foresee it tomorrow:

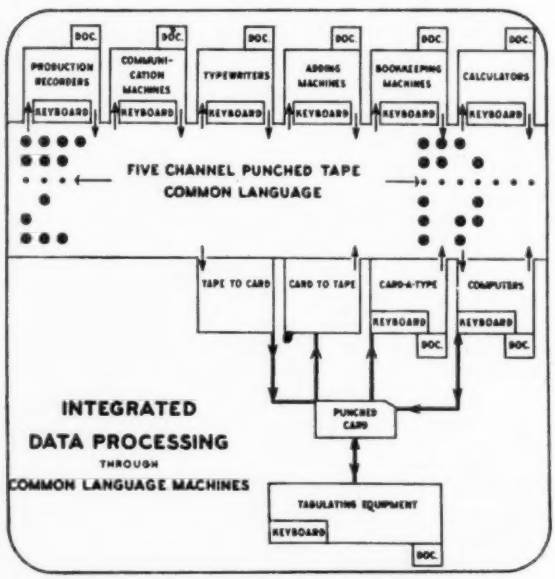
Integrated data processing is in a very real sense the foundation stone of the systems concept without which true automation, and the application of electronic data processing techniques to the office would be impossible. Integrated data processing, in other words, represents the first step toward automation, and there can be no true automation of the clerical work processes unless it exists. Yet, the first announcement of the principles which have done so much to revolutionize office procedures was made less than ten years ago,



Integrated data processing concept first evolved by systems personnel at U. S. Steel headquarters in Pittsburgh gained quick acceptance in American offices, and formed logical work flow basis for eventual installation of electronic data processors.

I.D.P. formed a firm basis for the later application of electronic data processors





Illustrative charts shown by U. S. Steel personnel at AMA conference where integrated data processing concept was first outlined.

when United States Steel, defining the phrase which it had devised, and which was being used as a principle throughout all its systems work in the company, declared:

"The concept of integrated data processing through common language machines is:

"1. Record data at the point of origin on office machines which create punched tape or cards as the automatic byproduct of the recording operation.

"2. Process original and subsequent data on office machines which read and punch tapes or cards.

"So that

"All data is self-perpetuating."

On that simple principle, major revisions have been made in business systems across America. And widespread general acceptance of that principle, offering as it did—indeed demanding as it did—standardization and simplification of clerical work processes—made it possible to organize and systematize the multitude of channels through which data must flow in the office to the point where computer applications could be practicable. It also advanced for the first time the concept of a "common language" for office machines—in this case five channel punched paper tape, which could activate, instruct, and feed data to each machine in a processing sequence.

It thus mechanized—and speeded—to a high degree the entire paperwork chain, and so formed a firm and workable base for the later application of electronic data processors with their absolute need for standardized input information fed in at high rates of speed.

Although many of the early computer applications in business were the scenes of serious and costly mistakes due to improper or too hasty systems planning before installation of the machines, there is no doubt that without the impact on systems planning of the I.D.P. principle,

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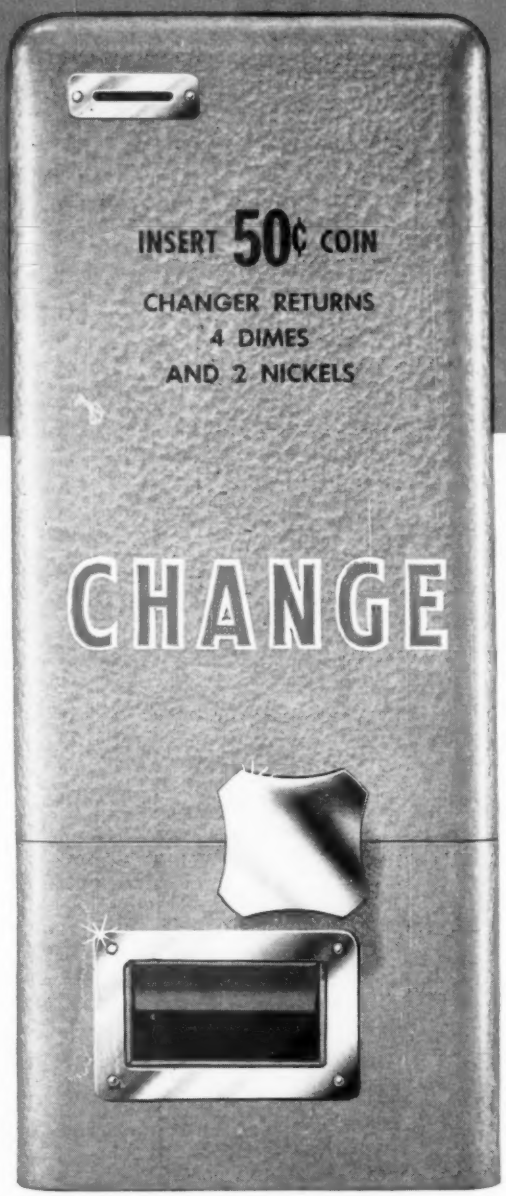

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The premium is on speed, and more speed

the progress of automation in the office would have been slowed badly, and the chaos that occurred in a few instances would have been far more widespread.

On June 26, 1956, Sylvania Electric Products, Inc., opened at Camillus, New York, just outside Syracuse, the first national data processing center designed to handle paperwork processing in various areas for each of the company's facilities spread across the country. Camillus itself was chosen as the place for the center as a result of linear programming techniques which determined that the upper New York State location represented the most logical position in the country for minimum load on the leased wire telegraph lines which tied the center into all Sylvania's scattered facilities. As Don G. Mitchell, Sylvania's board chairman and president, reported at the opening:

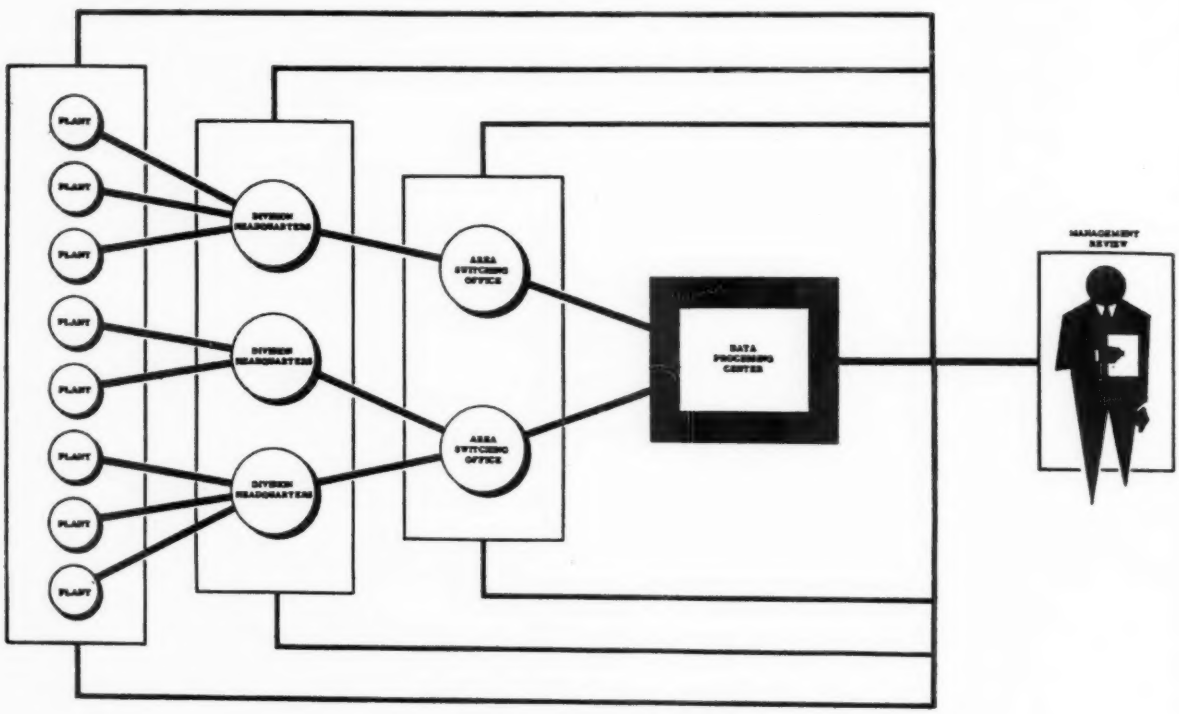
"This data processing system of Sylvania's is not the first time a company has tied together all of its facilities from a communication standpoint. Nor is it the first time an industrial organization has used an electronic computer to process a variety of business information. But it is the first time that the two concepts have been combined on a company-wide basis—the first time that an entire company has been tied together from a communications and data processing standpoint.

"And this is why we did it: Automation in the office—administrative automation—is becoming just as vital a tool of industry as automation or mechanization in the manufacturing plant. Since the very essence of our free enterprise system is intense competition, that means that an organization must move rapidly and thoroughly and effectively to take advantage of the opportunities available to it, or it falls by the wayside.

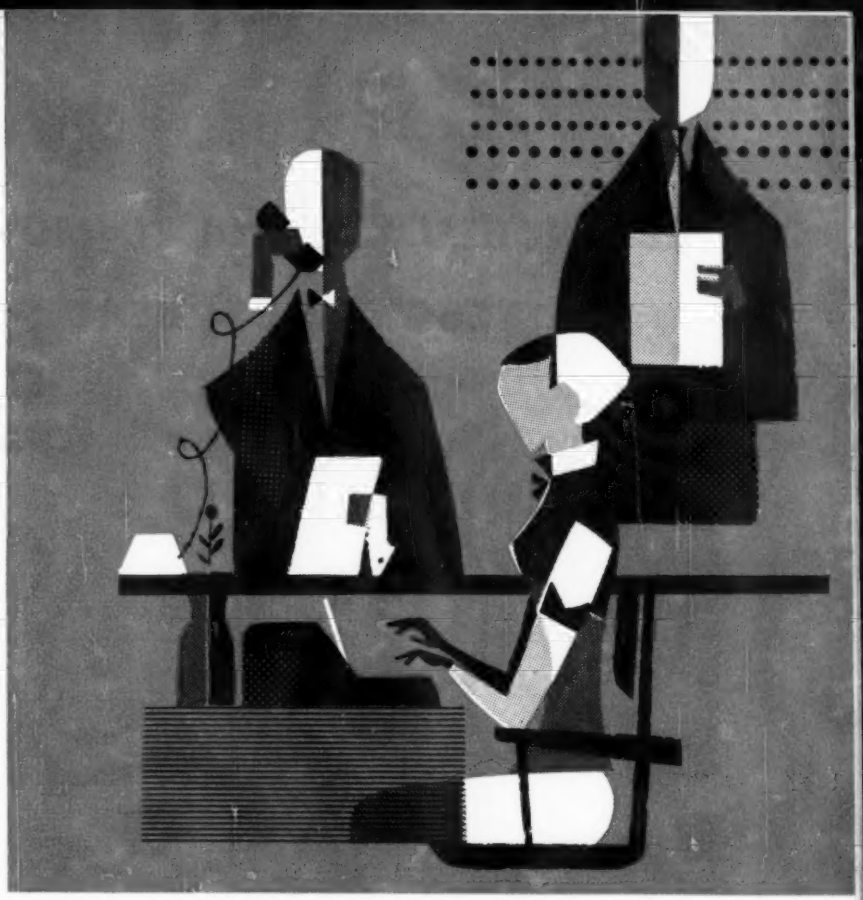
"As many of you know, a constant flow of vital information flows through the arteries of an industrial organization. Granted that every so often the arteries get clogged to varying degrees with information that is not only not vital, but completely superfluous, there is nevertheless a flow of information which must not be impeded. The premium is on speed, and more speed in compiling, transmitting, and processing an enormous variety of operating information and putting it to work."

Sylvania's data processing center was originally planned as a "nerve

(*To page* 181)



Schematic representation of Sylvania Electric's data processing and information consolidation network.



PERSONNEL

In the last ten years, the office personnel picture changed more radically than at any time in history. Here is a review of these changes and the forces which brought them about. Here is a look at the future, too, at the trends which will continue to create great changes in the personnel field. The nation's work force, for one thing, is aging. The implications of this fact alone, for the office, will bring about far-reaching new policies in the years ahead.

PENDULUM SWING TO MORE RIGID BUSINESS ATMOSPHERE SEEN AHEAD

Automation will increase stratification of office work force

Women workers, who already form a majority of the office work force, will assume increasingly important role in years ahead, both in terms of numerical strength, and greater responsibility.

By EDITH CONNER
Associate Editor, *Office Management*

JANUARY, 1950 began a decade that was to see a great many changes in the office personnel picture. Outstanding in the fifties was the introduction—and rapid development—of automation, a concept which became at least an apparent threat to job security as machines were developed that could replace human workers. In some instances, too, the threat was realized, as offices, unfamiliar with the demands of automation, released workers without first testing whether they could do without them. For other workers, automation meant learning a whole new "language," developing new skills. On this basis, the introduction of electronic devices added a new dimension to office personnel—the highly skilled worker who *had* to be skilled in order to keep her job.

The fifties was a decade, too, which saw the advent—or at least the recognition of—the organization man, psychological testing, management training programs and, more and more, the woman executive. It was a period, in the main, of an intensive study by management of its workers.

Whether the study was too intensive, or at least intensive in the wrong directions, is a moot, but hotly debated point at the moment—as it has been during the latter half of the past ten years. Business, fascinated with science—and the rules of formal logic as applied to the often tangled and quite illogical work patterns that had developed over the years in which offices grew as unwanted and unwatched adjuncts of the production and sales functions of companies—decided that easy formulae could be applied to people, too. Give them fringe benefits, nice looking offices, congenial companions—and check every applicant to make sure he'd fit into the work group—and all problems would be solved.

Obviously, all problems haven't been solved: if anything, there's a strong counter feeling that the extremes to which some of the formulae have been carried have aggravated the problems, rather than alleviated them. There is no doubt that fringe benefits and good sur-

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Too little tension may be as bad or worse than too much

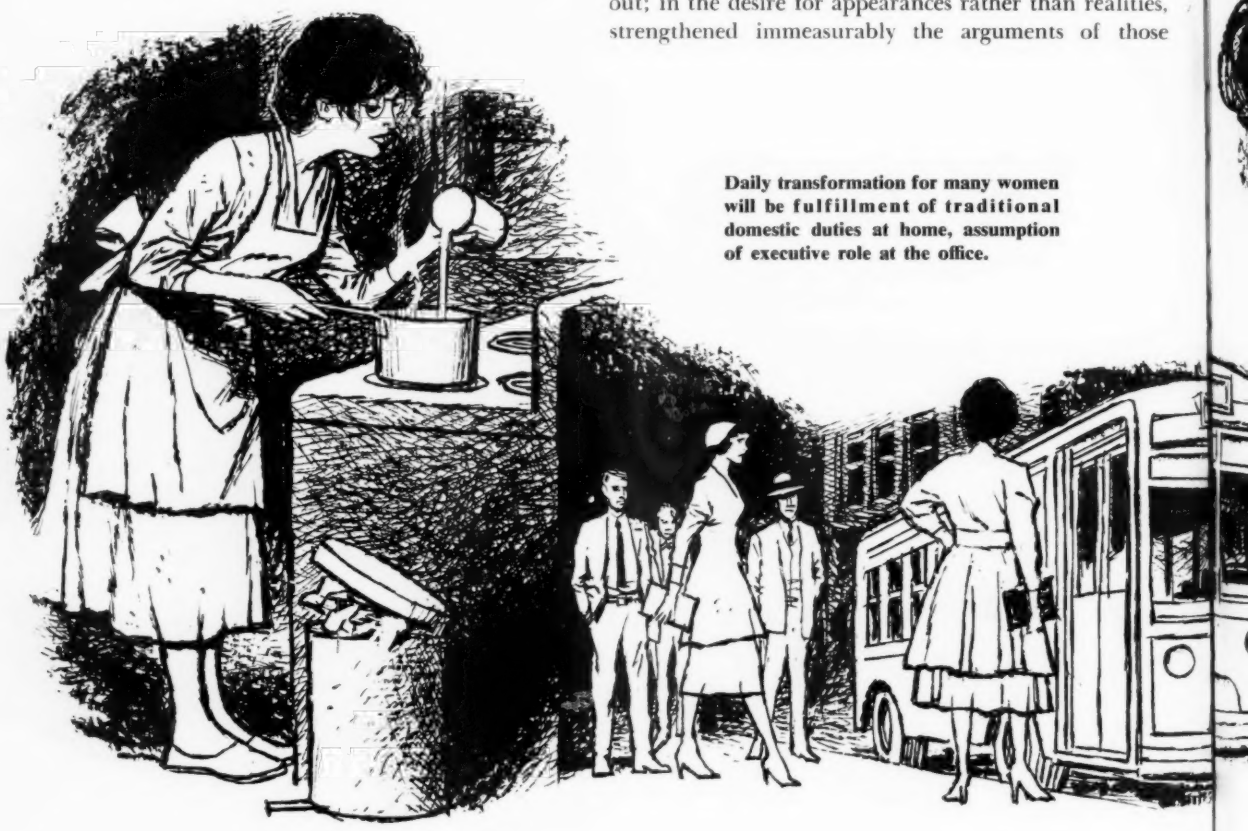
roundings have increased the pleasantness of work in the office, but whether they have compensated for the lack of challenge, the lack of contrast between people, the lack of incentive because, psychologically, circumstances are too comfortable—this is debatable.

There is a growing medical theory that tranquilizers, except for the psychotic, are an easy solution that does more harm than good. Too little tension is as bad or worse than too much. To the same degree, a growing malaise has appeared that circumstances in the business environment today have been made too dependent on "the team," on the concept that good, smooth working relations are far more important than good work, that the exceptional people are too much trouble because they make the average people too uncomfortable.

This discomfort with the mores of the business environment in the 1950's was mirrored more and more violently toward the end of a decade in which "peace and prosperity" were the keynotes, but in which a growing number of people began worrying more and more over the future price they would have to pay for current comfort. Books, from "The Organization Man" to "Life in the Crystal Palace," expressed greater and greater doubt about the paternalistic tendencies of American industry as reflected particularly in the office environment. and—it is worth noting—these books were not the brain children of men and women who were primarily philosophers or critics of the business scene. They were, rather, the products of people who were either involved in that scene as active members of the particular communities they analyzed, or writers whose careers had been devoted to business.

Disillusionment rising

The general wave of disillusionment and shock that crossed the country during the latter half of the decade when it became apparent that the United States, the world's greatest power at the beginning of the fifties, had let that power slip through its fingers in the pursuit of slogans, reassurances, and the easy way out; in the desire for appearances rather than realities, strengthened immeasurably the arguments of those



Daily transformation for many women will be fulfillment of traditional domestic duties at home, assumption of executive role at the office.

who had warned that the ubiquitous committee was a poor substitute for the courageous leader, that perhaps a little friction was a better thing than eternal compromise, that a business environment built on everyone being friends might be pleasant, but was not able necessarily to compete with a business environment in which major emphasis was on everyone being good at his job.

And that sense of shock was aggravated by, of all awakenings perhaps the most rude and the most indicative, the nation's deep sense of outrage when it discovered that television quiz shows, which never pretended to be much more than entertainment, had been rigged. The more sensitive and perceptive of the people were quick to notice that the general reaction of too many of the American people was that the contestants had done the right thing in going along with the fakery, that the important thing in life was the "quick buck."

The decade ended, then, with a searching analysis on the part of many as to just what path America, in its

The fact that a job is interesting doesn't prove that everyone can do it. Some people are best fitted for routine work.

Movement of many offices to suburbs may also have effect of drawing many married women back to work.

standards, its values, and its goals, was following. And the doubts voiced by many in the middle years of the decade were finding more and more endorsers as the ten-year period drew to its end.

Thus, the pendulum seems to be swinging back again toward some of the more traditional business values, and a critical reassessment of some of the panaceas that have been accepted so uncritically during an easy ten years. The impact of increasing foreign competition, even if the boom that is anticipated for the sixties should hold throughout the ten years, should strengthen that reassessment.

Other factors affecting picture

There are other factors that will affect the entire personnel picture to reinforce this reassessment, factors that are implicit in the present social structure of the country.

We are entering a period in which our prime work group, the men and women between the ages of 35 and 45, are, relative to the rest of the population, a smaller percentage of the work force than they ever have been before.

We are entering a period in which the pressures of an "exploding population," even though it does not yet affect the American scene directly, are making more and more people examine the social necessity or desirability of the large families that have become the pattern since the war years.

We are entering a period in which the number of women of marriageable age is steadily growing larger than the number of men of marriageable age.

We have long since entered a period in which, even at the average family size that became fashionable during the fifties, most women have completed their families by the mid-thirties.

We are entering a period in which the effects of automation on the office will inevitably force offices into a more rigid work pattern. Even though many jobs will become more interesting as a result of machines assuming much of the dull repetitive work that has been done by humans in the past, the fact that a job is interesting does not necessarily prove that *anyone* can do it. Some people are better fitted for routine, repetitive work than they are for creative work. A greater abundance of stimulating and demanding jobs as a result of automation is going to mean, inevitably, a greater demand for the type of people who can fill such jobs—

This necessarily more rigid stratification will make stronger than ever the class divisions that have already become so apparent in so many offices

well-trained, creative people with imagination and initiative. Yet, at the same time, the demands of automation for standarized work patterns are going to force a degree of uniformity and control on the lowest levels of the clerical hierarchy that will be far more important to the functioning of the whole enterprise than has ever been true before. And, too, this necessarily more rigid stratification will make stronger than ever the class divisions that have already become so apparent in so many offices between clerical force and executives. In the future, it is perfectly possible that we will see three major groups in the office—basic clerks preparing input data—a middle group working with the machines that will assume an increasingly important part of the routine duties and decision-making—and an executive group. And since each of the groups will have duties distinctly separated from those of the others, the result may well be a form of job stratification far more emphatic than anything ever seen in the past.

Correct initial assignment vital

But this job stratification, even though it may be rigid once a worker has entered one or the other of the major work groups in the office, may, by the very strictness of its classification system, and the difficulty of crossing the barriers once a job has been taken in one of the three main groups, require a greater flexibility on the part of business in choosing the group to which incoming employees will be assigned. The old, easy system under which business school graduates and products of the best men's colleges were automatically slotted for executive roles, and most women were, regardless of their educational backgrounds, assigned to lower echelon positions, will undoubtedly be modified, as the specific temperamental and educational demands of each of the three categories become more important than any of the comfortable rules of thumb that have been so reliable a crutch of the personnel selection function in the past.

Undoubtedly, the necessity for a college education in order to achieve either of the two top ranking groups will become even more certain in the sixties, but the emphasis on business school education will undoubtedly lessen. Mathematics, the sciences, and the liberal arts in general will gain a higher business value as the major problems of business change from problems of technique and specialized knowledge to problems of logic, foresight, and relating individual business problems to the broader trends affecting the economy as a whole.

This—and the general shortage of people in the most active work age group—will undoubtedly force down many of the ancient barriers that have traditionally separated women from the executive role. Moreover, the leading role taken by women in the comparatively new and fast-developing field of automation will mean that an increasing number of them will be absorbed almost automatically into higher business echelons as automation becomes more and more of a standard for American offices. The overage of women over men, the fact that more women are entering college today, and the probable de-emphasis on early marriage and large families that was so important a characteristic of the fifties, will probably re-enforce the emergence of women as a minority, but, nevertheless, a substantial one, in the higher executive echelons.

But the rigidity—or the comparative rigidity—of the three groups into which office workers will be divided as automation becomes more and more of a reality in American offices will lead, almost certainly, to the office facing a problem which in the past has not really troubled it very much—unionization. The scare effects of any degree of mechanization have already been seen in the steel dispute, which erupted at the end of 1959, and in the rail negotiations that are going on now. As more and more emphasis is placed on "freezing" of work rules to prevent management introduction of mechanization in production, the whole vague threat of "automation" will assume more and more of a scare value in the average worker's mind, in the office as well as in the factory. As offices, in turn, are inevitably affected more and more by automation, the average office worker's susceptibility to unionization efforts is bound to increase.

This means that the management anxious to avoid unionization of its clerical employees is going to have to devise work incentives that really stimulate workers, must find ways or channels by which workers in one of the three major groups who have the ability to advance to the next highest are encouraged and aided to do so, and, finally, is going to have to strike a nice balance between advancement on the basis of ability within any given work category, and advancement on the basis of seniority. For it is only by retaining some of the traditional office values and standards, while at the same time introducing some of the changes the union will offer to persuade workers that organization is to their advantage, that management can avoid such organization of its employees. A compromise will have to be worked out to suit the new circumstances, and the new conditions that will make the office of the future so different in so many ways from the office of the past.

GENERAL VS. SPECIALIZED EDUCATION FOR BUSINESS: THE DEBATE GROWS HOTTER

Changing nature of business poses new problems for business schools

An *Office Management* Staff Report

FRANKLY, we're under attack from every side—and we don't quite know how to reply. How can we tell whether we're training our students adequately for the business world ten years from now, when no one today really knows what will be required of executives then?"

The speaker was a leading educator from one of the oldest and most distinguished of America's graduate schools of business administration—and he was voicing a common concern that is occupying more and more business attention these days as both business schools and thoughtful corporations try to decide just which are the important executive talents and requirements.

For some years now, many leading American corporations have been finding that while they have specialists for all the secondary executive roles in their management, they are perennially short of men to move up to top positions. And gradually more and more of them have become convinced that too much emphasis on specialized business education in their personnel recruitment policies through the years has left them with an unbalanced management group, a group which has specialized too soon in its educational pattern, and has continued this narrowing of interests and, therefore, of balance

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Too many bright young men, culled from specialized schools, prove strangely lacking

and perspective throughout its business career. Thus, by the time executives who have fallen into this trap are prepared, in terms of their performance on the job and their service with a company, to move into top positions, they are often not equipped to form broad enough judgments to fill the requirements of such positions.

This is the basic argument that is being heard more and more often as another example of the general counteraction setting in against so many of the personnel practices and beliefs that were accepted almost as gospel at the beginning of the fifties.

The bases of the new doubt are succinctly stated in the introduction of "Toward the Liberally Educated Executive," a collection of papers by businessmen and educators arguing the need for much stronger emphasis on liberal arts training and background for those who must some day fill top executive roles.

"Big minds" needed

To quote from the introduction, written by C. Scott Fletcher, president of The Fund for Adult Education, which sponsored the book:

"This little book is designed to illustrate three propositions which are fundamental to an understanding of the education of executives in our time.

"The first is that the tasks executives have begun to face today and will inescapably confront tomorrow, arising out of the economic and social roles of corporations in American life, are of a magnitude that cannot even be properly grasped, let alone successfully dealt with except by men with 'big' minds.

"Second, that in terms of education, the best way to cultivate the requisite 'bigness' of mind is through the liberal studies, conceived as those areas of knowledge which enlarge the understanding and deepen the insights of men both with regard to men themselves and men in their social relationships, and which, at their highest levels, assist them to develop the capacity successfully to deal with these abstract ideas that illuminate and allow them more wisely to control the world in which they live.

"And, finally, that since the needs of men for understanding and insight are *never* wholly met—that no man can ever congratulate himself that he has all the understanding and insight he needs—he should early in life acquire the habit of turning to the liberal studies in his leisure that he may refresh himself and keep on growing. Liberal education, in short, should be continuous throughout life."

While the viewpoint is far from universal, it is gaining more and more currency with top management, deeply aware that too many of its bright young men, culled from the specialized schools, are strangely lacking in many of the fields of knowledge and competence that are required of them as they move up in the company hierarchy. Thus, during the past ten years, more and progressive companies have been experimenting with educational courses geared to teaching responsible executives some of the areas of generalized knowledge provided in the typical liberal arts

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"The best way to cultivate 'bigness of mind' is through the liberal studies"

Retirement age-span is widening. With 65 as arbitrary standard, trend is to lower optional, higher mandatory retirements.

THE "AGED"—MANAGEMENT'S DILEMMA

Hiring, retiring the older worker poses increasingly complex problems

THE IMAGE of America as a happy, heedless, "youth centered" place is in for considerable change. The plain truth is, we're getting old.

Our population and work force are aging. The average "aged" man is a stronger fellow socially and politically – though not always economically. He is part of a pressure-group-in-the-making, one that is destined, in the sixties, to increasingly get what it wants from government and industry. It will force its demands on office policy-makers in particular, sometimes pulling management in several directions at once, often pushing it to difficult and "radical" decisions.

Right now there are approximately 15.8 million Americans aged 65 or more—and the number increases by 1,100 a day. In 1975 there will be an estimated 20.6 million people over 65, representing a rate of growth in the 20th Century of 47 per cent as against 32 per cent for the total population. Life expectancy today is 70 years, compared to 48 in 1900.

The "population explosion" among the aged, however, has not been matched by similar increases in the number of available jobs and the number of available dollars. Here is where the pressure begins to build.

Sixty per cent of the men over 65 are unemployed; the percentage of

Policy of hiring aged may unsettle pension funds, labor relations—

women is higher. Testimony that 10 million elderly Americans subsist on $1,000 a year or less was heard by the Senate Subcommittee on Problems of the Aged and Aging at a recent meeting in Miami. A survey issued last month by the National Committee on the Aging showed that among older workers who don't want to retire at 65, over half say financial reasons are behind their desire to remain on the job.

The problem of the aged troubles unions, too, but for reasons understandably different from management's. Unions fear the "cheap labor" market which the growing pool of older workers presents to the cost-conscious companies which dip into it.

Pressures begin to tangle

Here's where the pressures begin to get tangled. Many older workers – usually with justification – complain of management "prejudice" against hiring them. Management *reluctance* or management *policy* might be fairer words, but the fact remains that the old (and even not-so-old) worker is barred from employment in many companies.

Last month in Detroit, the same Senate subcommittee mentioned above spent a whole day hearing testimony on the "younger older worker." This person—according to several witnesses, including the director of Michigan's Employment Security Commission—may range in age from 40 to 64. He is "too old to work and too young to retire," yet he represents one-third of the applicants seeking work through Commission offices.

Companies thus face this dilemma:

If they appease the forces clamoring for fair treatment of the aged (camped under the "Hire Experience" banner), if they agree to hire workers 40 and over, they run the risk of upsetting their personnel structures far more seriously than if they stick to policies of Youngsters Only.

They can become entangled in the technicalities of their pension plans, which frequently can't accommodate older newcomers too easily.

They can rouse unduly the touchy feelings of veterans within their organizations who look to seniority as the key to privileged treatment.

The "Seniority" banner fluttering over this camp *may* have a union label on it. More likely where office employees are concerned, it's a banner on which the union would like to *get* its label. With white-collar workers looming large in unions' plans for the sixties, organizers hope to appeal not only to employees' worries about seniority rights, but to the "pocketbook worry" evoked by the claim that older workers tend to lower wage rates.

Or companies can refrain from hiring older people.

In doing so, they fix a policy running against the prevailing trend; against the aging character of the population; against the grain of the society from which they must recruit employees, in which they must exist as companies, in which they seek new markets.

Laws against age discrimination

In doing so, they may also violate the law. They would in Connecticut, Massachusetts, New York, Pennsylvania, Rhode Island, and Wisconsin—all seven of which have statutes making it illegal for companies to discriminate against prospective employees because of age, or to place "help wanted" ads with age stipulations. Such conduct is also technically outlawed in Colorado and Louisiana, but the statutes there are old and unenforced. The New York law punishes violators with fines up to $500 and/or imprisonment up to one year. A spokesman for one organization interested in problems of the aged calls this law, as presently set up, "a good start."

So if more than 80 per cent of the states have yet to pass age-discrimination laws, it's a safe assumption that this percentage will have shrunk considerably by 1970. Aged peoples' greater political strength, and changing public (and management) attitudes, are bound to make it happen.

What the unions say

On this front, too, unions will be active. While on the one hand they resist hiring the aged, on the other they offer an argument hardly in sympathy with management policies of hiring only the young.

This relatively new union argument—with ramifications as deep and formidable as the unseen part of an iceberg—was summarized publicly last month at the annual meeting of the National Committee on the Aging in New York.

Clinton S. Golden, former international vice-president and now part-time consultant to United Steelworkers of America, reiterated the long-standing labor contention that to an extent an employee's job is his property, that his right to this property increases with years of service, and that society will one day recognize this right.

Golden then asked, in effect:

How are these property rights to be recognized? In cold cash, what will they be worth to the old and "young-old" workers displaced by automation? If no company will hire them – if they are not old enough to retire, or, if old enough, are unable to subsist on retirement pay—what can we do to help them?

"If work is available at all to men over 40," Golden said, "it is largely marginal at subsistence wages or less, and will not provide a living for a man and his dependents on reasonable standards of health and decency. . . . If my conviction that his job, as his property, has been confiscated by the requirements of the system is correct, then the following possibility for labor-management cooperation opens up:

"1. That all reasonable attempts will be made to plan ahead for such contingencies and the earliest possible warning given. . . .

"2. That there will be a priority claim on any possible opening elsewhere in the enterprise and a transfer of his property rights to a job there.

"3. That management, first on a company level and then on an industry-wide basis, will attempt to have a coordinated system for exchanging of information and rapid communication of employment data. Then, that arrangements will be worked out whereby the costs of the movement of the worker and his family . . . will be absorbed as a part of the costs of doing business.

"4. That for those for whom no work exists in their field, a continually replenished reserve, built from the savings of automation will be maintained. From this reserve, the necessary monies will be provided for vocational rehabilitation of workers when their jobs have become obsolete.

"5. Pension rights, after a reasonable minimum time, will be transferable to make mobility more attractive and prevent the loss of the much needed security for old age.

"6. Obsolete and unnecessary rules discriminating in hiring on the basis of age will be discarded.

"7. Supplementary benefits and severance pay will be improved to reduce the sudden impact of catastrophic personal crisis on an older worker and his family due to unemployment.

"8. Labor and management will work jointly to find sound and constructive legislative programs for presentation at the State and Federal level to handle those problems so broad in scope that they are beyond the best efforts of private groups."

This, then, is labor's viewpoint—or, more accurately, one facet of labor's viewpoint as expressed by one labor spokesman. It presents a broad plan, socially conscious and not inexpensive. Its eight points, however, tacitly assume that the aged employee wants to work. They never come to grips with a crucial question: *"Does* he—really?"

A social worker at the same conference attended by Golden said this: "The majority of people around 65 don't want to continue working."

Committee on the Aging's survey found "some tendency" among corporations toward lower optional retirement ages (though it found the same tendency toward higher mandatory retirement ages).

Attitudes of older workers

How *does* the average aged employee feel about working?

That same survey—taken among 110 companies each employing 10,000 or more persons—found this:

1. Between 40 and 60 per cent of male employees want to keep working at their regular jobs after 65.

Interestingly, nearly 60 per cent of those who said they wanted to retire work in companies where retirement at 65 is mandatory anyway. Survey authors said they had no evidence to indicate whether liberal pension benefits, "conditioning" programs, or surrender to the inevitable were mainly responsible for this attitude.

2. Sixty-six per cent of the men who want to remain at their regular jobs after 65 are acceptable to management.

In other words, 35 per cent of *all* 65-year-old employees can do the job management expects of them.

3. The percentage of male employees wanting to work and actually retained after 65 varies widely. Retentions of from 50 to 85 per cent are common.

In other words, many employees not totally "acceptable" to management are kept on nonetheless.

Said one company: "During the past one-year period, 195 male employees reached age 65; 68 of these requested retirement [35 per cent]; 127 requested continued employment [65 per cent]; 108 of those requesting continued employment were allowed to continue working [55 per cent]."

Said another: "Of those employees attaining age 65 in 1958, 82 per cent also continued to work, and of those attaining age 67, 77 per cent continued to work."

Said another: "We permit retired employees to work after retirement on a temporary, seasonal basis for up to sixty days in each calendar year. This post-retirement employment . . . in no way affects their right to retirement benefits. It does, however, give them an opportunity to earn a little additional money without jeopardizing their rights to Social Security benefits."

4. The primary reason for wanting to work after 65 is financial. Job satisfaction and need for useful activity are frequent secondary reasons.

Said one company: "Money need was the commonest reason given and was probably an underlying cause even when respondee gave another primary reason. We have no doubt of the validity, since all will have to accept a reduced income at retirement. The availability of pension benefits did not seem to be a major factor, since employees with 'more' pension rights were as likely to express a wish to stay on as those with 'less' pension benefits."

Said another: "The 'financial' reasons in some cases reflect need, but in others we think it demonstrates a lack of any plan to live the leisure years with a feeling of belonging or of accomplishment."

5. The main reason for wanting to retire is to "take it easy." Health and financial independence are frequent secondary reasons.

Two out of three sexagenarians say they've worked long enough, and looked forward to enjoying other activities. Forty-five who were surveyed expressed reasons of social policy—that they should move out to provide jobs for younger men or

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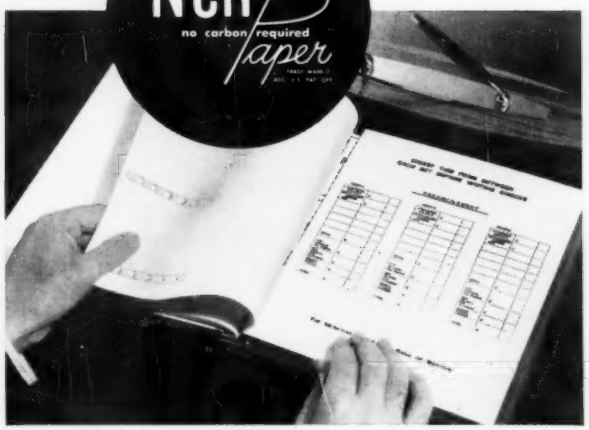
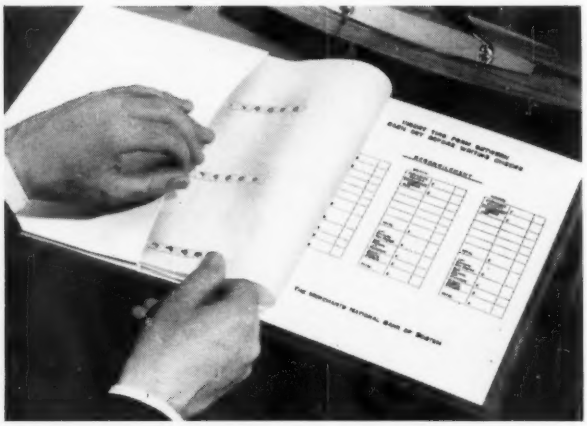


HOW TO USE DUPLI-CHECK:

1. Insert separator form under checks and copy sheet

2. Make out checks



3. Tear out checks (note exact duplication copy sheet)

4. Slip copy sheet under protective flap

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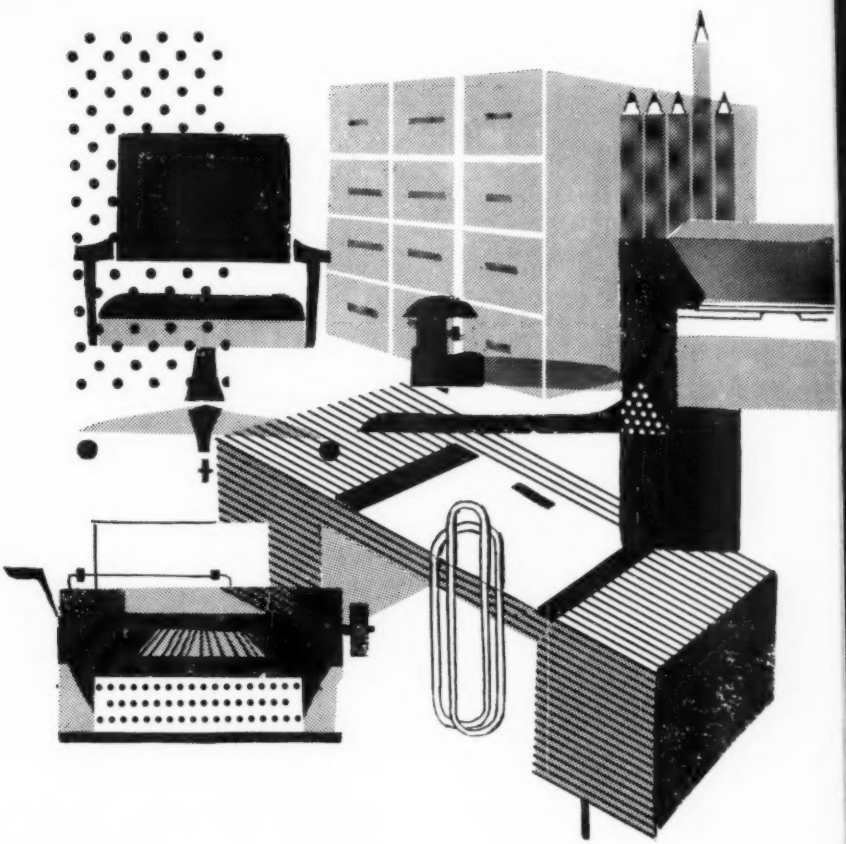
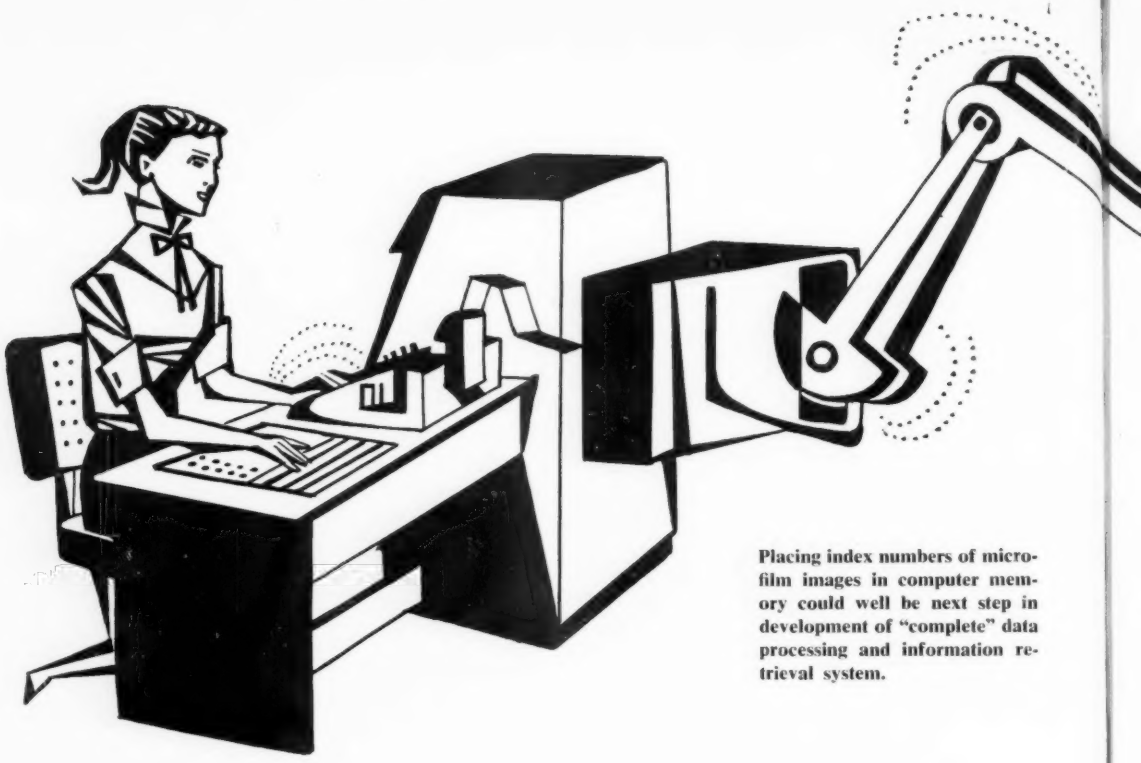


SYSTEMS

DESIGN

Design — whether artistic or managerial — means order, balance, harmony. This, then, is the all-embracing framework, the fundamental pattern, the intelligently planned routine by which the office accomplishes its work. The importance of this design increases continually because the complexity of office work increases continually. This section analyzes some of the newest techniques in good systems design.



Placing index numbers of microfilm images in computer memory could well be next step in development of "complete" data processing and information retrieval system.

HIGH-SPEED PHOTOMEMORY UNITS COULD SUPPLY AUTOMATION'S SECOND DIMENSION

Development of random access to miniaturized graphic images promises to be coming decade's most significant technological advance

By ROBERT SHIFF
President, NAREMCO Services, Inc., New York

THE most significant developments in the office during the fifties were—

The impact of computers.

The great impetus given systems work by the interest and attention focussed on automation.

And the development early in the decade of the integrated data processing concept.

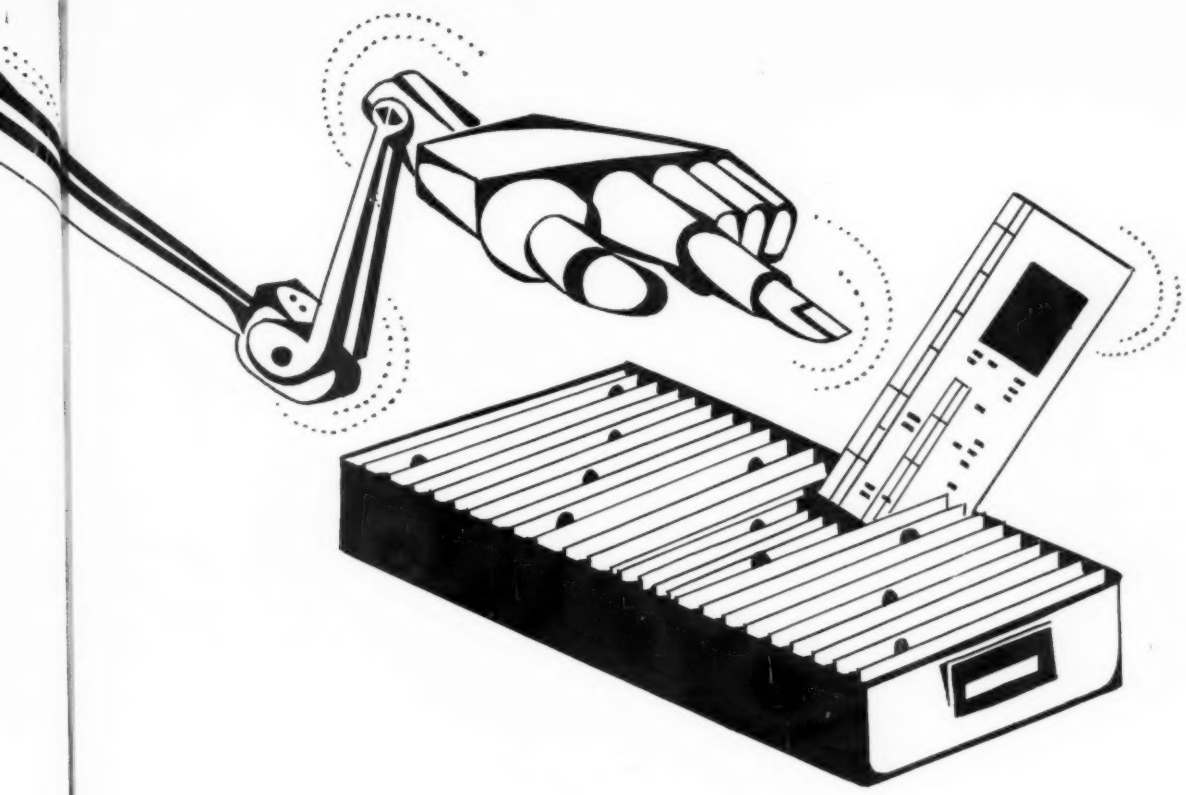
I believe the development of new automated systems of document and information storage and retrieval will be the great innovation of the sixties.

Actually, of course, a computer represents a form of information retrieval, but this is neither the best possible nor most efficient use of the computer's abilities. Nor is it wholly satisfactory for many management purposes.

Much information is best presented and assimilated in graphic form—in terms of original source documents, or reproductions of such documents. But traditionally this has meant problems of storage and problems of retrieval, even in cases where microfilm records were made of original documents. Essentially, microfilm offered a reduction in space requirements, but presented the same problems in terms of manual filing, and manual retrieval that filing of original documents involves.

Now, for the first time, mechanized methods of rapid identification, selection, and delivery of desired microfilm records offer real possibilities of achieving strides as great in the field of information retrieval as we have made in the past ten years in the area of information processing.

This can add a whole new dimension to the concept of data checking and processing. Basically, an electronic data processor demands translation of all incoming data into "bits" of information, which it can assimilate and



handle at fantastic speeds. This is excellent in terms of data which are basically mathematical in nature, or of data which are repetitive in nature, but it is extremely unwieldly in dealing with exceptions, or with highly detailed information, which must be evaluated as a whole rather than as a series of separate, sequential "yes or no" decisions.

Contracts, correspondence, mortgages, credit reports, loan application files—none of these types of important and voluminous business papers lend themselves readily to total electronic computer applications. There are too many factors, too many individual details, each of which influences the final decisions or action, for efficient electronic handling. In essence there are too many bits of information for effective utilization of data processing equipment.

But if we can achieve high speed random access to any desired miniaturized document of the type that does not lend itself to electronic data processing techniques, we begin to approach complete data handling systems—electronic computers can handle the routines, and the condensation of masses of simple data into meaningful management operating information. They can also be used as controls in areas where decisions are based mainly on figures.

Immediate graphic representation or reproduction of pertinent information in the other great area of business papers, the area where computers cannot operate at full efficiency, can give us the missing dimension of office automation.

And such immediate location and reproduction of graphic records is exactly what manufacturers are beginning to offer us today, and will continue to offer in improved versions during the years ahead. Thus, we gain a mechanized capability to handle entire documents like bits of information.

Punched card techniques available

Already we have combinations of microfilm records and punched cards, which allow us to use punched card selection and withdrawal techniques for extracting the desired document images from a subject file. Identifying subject codes covering a whole category of information are punched into each combination microfilm-card record, as well as identifying individual code numbers. Requests for information in terms of subjects and qualifying terms or phrases are coded and punched into tape to correspond with the identifying code on the card. The. taped request will immediately select and produce the exact microfim records required to cover the inquiry. These, delivered to the inquirer, can either be read by him on a viewer, or, if prolonged work is necessary, can be made into hard copies through an enlarger-processor (fast copies). Documents and coded information can now be combined on video tape with magnetic dots used for identification purposes.

Another automatic retrieval method already developed depends on individual magnetic cards as the basic medium for information storage. Information—rather than microfilm records—is entered on the card,

which has a capacity of 1000 decimal digits, or 600 alpha-numeric characters. Data are recorded on the cards and read from them by techniques similar to those used with magnetic drums. Special machines have been developed to process the cards at rates of six thousand a minute in sorting, selecting, and file searching operations. Moreover, an interrogation file has been developed to allow random access to any individual card. While this system has been developed basically for routine data processing applications, with individual record cards replacing the memory storage capacity of a computer, and a much smaller computer than would otherwise be necessary employed only as an arithmetic unit, the possibilities of combining such cards with microfilm records are obvious. In other words, using magnetic spots as the coding medium and the high speed access and retrieval techniques implicit in this system, extremely rapid selection and withdrawal from files of graphic information would be possible.

Still another manufacturer is currently working on an information retrieval system for the government based on electronic selection methods and microfilm images – "photomemory." It is expected that the system will be able to give the answers to simple English questions–or rather images of all the source documents that are needed for a complete answer–within a matter of seconds.

Logical association selector sought

So far, no company has come up with a duplicate of Memex, a desk-size machine predicted by Vannevar Bush more than 14 years ago, which could automatically retrieve an image of any document stored by association of logical ideas rather than by checking a master index. Locator indexes are still necessary. But companies today are working to develop systems which will identify and withdraw information by association of facts, rather than by search of indexes. And, even the index search methods, with today's high speed equipment, can require only seconds.

Most of the advanced work in this field is being carried out for the government, but that was equally true of the development of the first high speed computers. Commercial applications were not long in appearing after the first major computers had been designed for and put into use by government agencies.

The same trend will inevitably follow with mechanized "photomemory" storage. Indeed, it almost has to follow. One thing that has all too often accompanied computer installations is an immense increase in the paperwork output of the average company. Much of this was unjustified, and if proper systems design had preceded the computer installation, could have been avoided. But miniaturization of records at least offers a midway solution to this problem, while systems refinement will eventually narrow down the immense paperwork output of the electronic units. Perhaps even more important, however, are the implications of rapid access photomemory units in tandem with computers. Such units could relieve the great pressure for storage space in a computer memory. Instead of storing great quantities of facts and figures, a computer memory could be used as the master index for the information contained in photomemory. A query to the computer could produce directions which would activate the automatic selection techniques now being developed to retrieve graphic information. In a matter of seconds, one developer could produce hard copies of source documents or even of summary documents originally produced by the computer.

In other words, the computer could not only serve to select and bring forward in graphic form data which were not appropriate for recording in a computer in the first place, but could also wipe its memory clear of many of its own reports, except for their location numbers in the photomomory unit, as soon as they have been made.

Photo posting techniques are now available which are capable of posting lines of information to documents or card records already miniaturized on microfilm in photomemory units. This method of updating can be used for monthly statements and periodic reports.

We have already progressed in microfilming from roll film to strip film to aperture cards to film chips. Film chips, the newest development, while allowing much greater concentration of graphic information in a small space than aperture cards, seem to us to have some drawbacks at present as compared with aperture cards. The latter can be manipulated just like punched cards on available data processing equipment, can be handled manually as well, will allow several different sections of a file to be searched simultaneously, and can easily be updated as new information is received. The individual aperture cards clearly present advantages then over the conventional microfilm, both in terms of rapid access, and mechanical handling.

Film chips are stored on a long stick or rod, and while they can be filed and searched at random within existing photomemory units, they are not presently as adaptable to other, existing types of data processing equipment as aperture cards. They do offer the immense advantage of being very much smaller than aperture cards, and some systems offer automatic conversion of basic film chips to aperture cards when that is desired. Since each chip can carry more than enough code information to enable its ready identification within a photomemory system, it can serve very effi-

ciently in combination with new photomemory processing equipment, but not so well with the more conventional types of data processing equipment.

The danger implicit in all these new developments is the same one that handicapped so many companies during the early days of electronic data processing—the machines may outstrip the systems in which they are used. If photomemory units are not simply to save space, their unique potential must be mirrored by systems which take advantage of that potential. Such units represent basically a centralized filing system in which material need never leave the file, and in which any required information can be extracted from the file in a matter of seconds. That information could be transmitted by closed circuit television to a number of requesters. It would be read on a remote viewer by one man—or it could be reproduced in hard copies, original size for temporary use.

Systems approaches trail machines

The possibilities are limitless, but the systems approaches that can make best uses of these possibilities have yet to be worked out. The wise businessman will be watching the research projects being carried out by major manufacturers for the government to see possible applications to his own business. In the fifties, technological advances far outpaced systems advances, and this was responsible for many of the early fiascos in computer installations. Invention, in a phrase, became the mother of necessity. In the sixties, wise planning and alertness to the implications of each technological innovation could reverse this process so that systems needs would dictate the machines to be built.

And, in a way, the fifties, too, created the situation that makes increasing emphasis on miniaturization of basic documents inevitable during the sixties. The great increase in the quantity of paperwork that stemmed from technological improvements—and from new management demands—while in many cases unwarranted, is not going to be reversed immediately. Thus, storage problems alone become almost insoluble, and even the great memory capacities built into large computers have been exhausted. Miniaturization, together with high speed selection and access of needed facts and entire documents offers a solution to this problem. Nine hundred thousand filmchip records will fit into a three-drawer cabinet about the size of a standard four-drawer legal file. Each filmchip can carry

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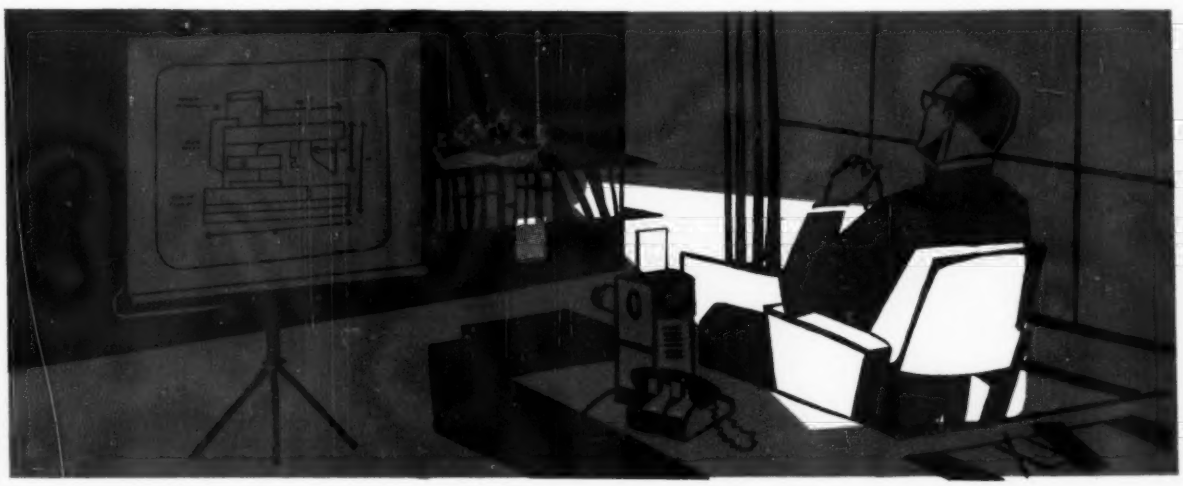
All desired information on a given subject could be quickly identified and extracted for use with a viewer, "hard copy" . . .



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SIMPLIFIED TIME STUDY APPROACH OFFERS KEY TO CLERICAL COST CONTROL

Technique also permits proper advance staffing for varying work loads

Tools of the technique: stop watch and clip board

By LOUIS C. KOPENY
Management Services Department
Arthur Young & Company

WITHOUT disrupting basic operations, office departments can, in a matter of months:

Increase productivity per worker from lows of 60 or 70 per cent to new levels of 90 and 100 per cent.

Make extensive staff reductions often as high as 50 per cent of the work force.

Tighten up on economy and efficiency without sweeping and time-consuming systems revisions.

Lay the groundwork for installation of new automatic machine equipment.

These things are being achieved in companies of all descriptions throughout the country — aircraft manufacturers, oil distributors, airlines, specialty manufacturers, insurance organizations and banks — with savings that run into the millions.

The means: A comprehensive application of clerical cost control techniques — in almost all instances based on work measurement. These techniques identify workers who need help or reassignment to other duties, eliminate unnecessary functions, pinpoint trouble spots, furnish a better basis for promotions and supply supervisors with specific guides for staffing requirements.

Traditionally, work measurement when applied in the office, has relied heavily on motion analysis techniques in which a predetermined time standard for each component action of a clerical task was projected against each element of the total task. From this, a given "correct" time for performing the operation could be derived, and then used as a measure against the number of times the worker

performed that particular job each day. Time actually spent by the worker, when compared with correct total time for the number of times the task was performed, would give a measure of the worker's effectiveness.

This technique is too cumbersome for the great majority of clerical duties. It requires exhaustive analysis of each motion made by the worker in performing his duties, plus involved mathematical computations and records.

Another system which is simple, but which has built-in drawbacks, is the "historical" approach. This system really doesn't accomplish very much, except to insure that a given clerical department doesn't grow worse in its performance; it merely freezes in current and past inefficiencies.

On the other hand, the comprehensive method, currently being applied on a wide front, offers great possibilities for a workable program; it can be installed quite rapidly, and at comparatively little expense.

Varying tasks covered

This method usually involves time study, based on the same theory as the stop-watch timing methods used for years in factory work measurement techniques, but with some significant modifications. However, it can also be used in combination with work sampling techniques. In any event, the end result is to set broad standards for the most common clerical operations and establish a valid work measurement system for the whole office.

Moreover, the system can be applied, after a training period by a company's own personnel, so that the whole operation can be maintained internally on a continuing basis.

Time study, as a basis of clerical work measurement, has long been opposed because of the varying nature of the basic office worker's duties, as compared with those of the factory worker, and because of the mental effort involved in many clerical tasks, which is difficult to evaluate by measurement techniques. Methods have now been developed which overcome these previous handicaps, and which make possible effective use of time study techniques in the great majority of clerical jobs.

These methods, combined under the general heading of clerical cost control, consist of five major steps:

1. Work simplification.
2. Work measurement.
3. Balancing staff with workload (accomplished not by mass firings, but by transfer, and the normal process of attrition).
4. Analysis and reorganization.
5. Establishment of budget controls.

The first step in a clerical cost control program, conducted on a department-by-department basis, is to determine the overall function of the department. This function determined, the analysis moves down a step further, to the various work groups, and identifies the specific things which the group is there to do. Analysis then proceeds to the third and final stage — the individual workers within the group — to determine the exact functions of each.

This is, of course, a standard systems approach, except that it starts with no preconceived notions of overall systems goals, but rather with unbiased analysis. This tailored approach is based on refinement of systems from the bottom up, rather than on setting up major system goals and then trying to achieve them by minute analysis and re-channeling of the entire company's work flow. Instead, by eliminating unnecessary steps in each individual job, and weeding out unneeded functions, the analysts automatically tighten up a company's entire systems pattern.

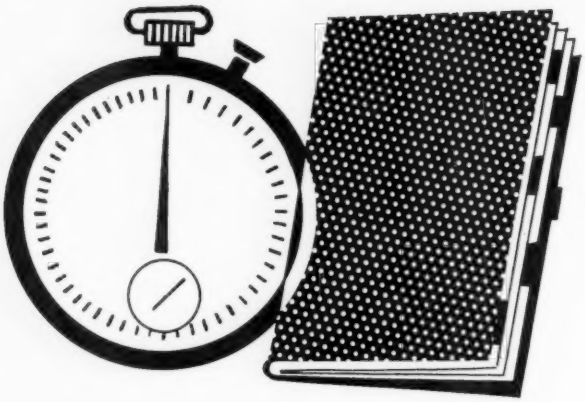
In other words, they go through a three-step analysis in each department, working from the top down and tracing each task of the department down to its basic level — to the individual worker at his or her desk. At each stage, the question is whether or not the task is required, and whether, if it is required, it properly belongs within the functions of the department, to the work group within the department, or to the individual worker who is doing it. Then, after weeding out everything that can be eliminated — in consultation with (1) department management, (2) group supervisors, and (3) individual workers, the analyst re-synthesizes each job, each group set of functions, and finally, the entire department's basic purpose and required work products.

Advantages of approach

This approach has great advantages over the major systems revision, for each department is cleaned up in turn, so that improvements occur while the work is in progress. Thus, it is not necessary to wait for an entirely new systems pattern to be developed for the whole company with a long and costly conversion period.

Now, on the working level, this means that each worker's basic duties, no matter how infrequently performed, are listed after observation of the worker and after discussion with him. This list is then checked to see how many of the duties are actually necessary.

Such lists are detailed for each worker, and the pieces of work — or elements as they are termed — are reviewed with each worker's supervisor. This determines, finally,



Time study has a forbidding sound. Actually, nothing could be simpler

whether any particular piece which the analyst thinks unnecessary is in the supervisor's opinion, really essential. Conversely, it determines whether anything which the worker is not currently doing should additionally be taken on.

The essentials of each worker's job thus determined, it is possible to reorganize the job, explain to the worker what he no longer needs to do, or what additional work, if any, he should perform and then proceed to the next step. In many ways the heart of the program, this step is the actual process of work measurement and establishment of standards.

Time study has a forbidding sound to many office managers. Actually, nothing could be simpler. But to eliminate some of its awesomeness, let's review what is involved in it.

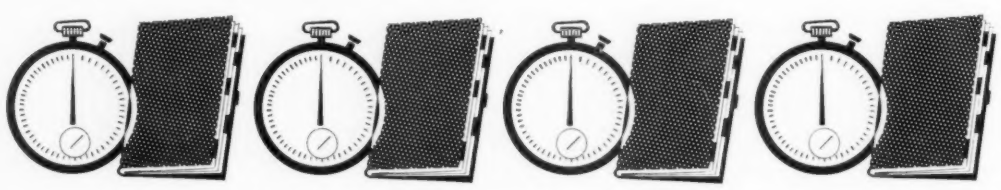
In essence, the theory is simplicity itself. By timing precisely how long a worker takes to perform a given task, or part of a task, and deciding whether the worker is acting at a normal pace, or at a rate slower or faster than normal, the analyst can establish a "standard" time for the particular task or "piece" of a task that is performed. This standard time can then be used to determine how many such tasks a worker should perform in a given number of hours. Thus, we can determine by a comparison of the number of times the worker performs that task during the week, and the total amount of time he spends on that task, whether he is operating according to the desired standard, or whether he is above or below it.

Analysts trained quickly

This requires some judgment on the part of the analyst, of course. However, people with relatively little background in time-study techniques can be trained in short order. For the training of analysts, movies have been developed which show workers performing various mechanical office tasks — collating, filing, sorting, etc. By study of these movies, a competent person can, in a fairly short time, become qualified to judge whether a given worker is performing physical motions at a normal rate or at a rate deviating from the norm.

Actually, a person's time perceptions, even without training, are usually far more accurate than one would suppose. A common demonstration of this point is achieved with the deck-of-cards technique. One of the analysts will deal a deck of cards at a standard rate of speed, asking the trainee to time him with a stop watch. The analyst will then deal at a much faster rate, and ask the trainee to estimate how much his dealing speed has increased before looking at the stop watch. It is surprising how close the majority of people can come to estimating the rate of increase.

This, then, is the core of the comprehensive system. The analyst, with his stop watch, observes a given sequence of physical actions performed by a worker, and determines whether or not the worker is carrying them through at normal speed. Where practical, the analyst may time every worker. In some cases, a selection of workers representing average skill and efficiency



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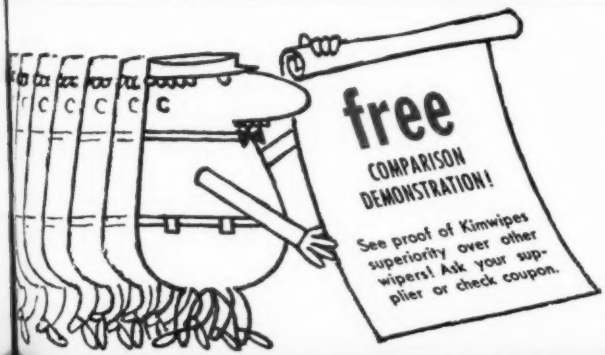

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Jobs requiring creative thinking, and certain exceptional tasks rarely lend themselves to time studies

may be timed to develop standards for a larger group. If the worker is carrying through his duties at a normal pace, in the analyst's judgment, the actual average time he requires to perform the sequence becomes the normal standard for that particular task. If he is working at, say, 80 per cent of what the analyst feels to be a normal pace, the norm is based on a speed rate 25 per cent in excess of the actual performance speed. Then an allowance of 15 per cent is made for fatigue and rest periods. All this provides a basis for actually measuring the work output of each worker.

Before time standards are put into effect, however, and used as a basis of work measurement, the elements of the worker's tasks for which standards have been assigned are once again reviewed with his supervisor. The supervisor can O.K. them as they stand. He may point out an extra factor in the worker's job which the analyst has overlooked, or he may spot some unnecessary task the worker is performing which could very well be eliminated. The supervisor is not asked to evaluate the time standards offered by the analyst — just the actual elements of the worker's job which are being measured.

Some of the tasks in an office, of course, do not lend themselves readily to work measurement techniques. Certain jobs which require a good deal of creative thinking, certain exceptional tasks, or certain jobs which are in effect dependent on the individual work methods and wishes of an executive — these rarely can be time-studied economically. Thus, it might be impractical to apply measurement techniques to the work of a private secretary since so much of her work consists of anticipating her boss's needs, and carrying out whatever individual tasks he assigns to her. Nor is measurement generally practical at supervisory and executive levels.

Covering individual tasks

But, it may be objected, large numbers of office workers do a variety of tasks, some of which are repetitive, but many of which are individual. So how does one make the overall system work?

Approach the problem this way. A worker's hours on the job are considered as falling into two categories — productive and non-productive time. "Productive time" is time spent on any work activity, whether or not it lends itself to measurement. Non-productive time is time within the work week which is used for activities other than work — donating blood, trips to medical or personnel departments or taking part in some company-sponsored activity, such as a band or choral group. The remainder of the week presumably will be devoted entirely to productive work.

Now, the worker's given tasks are divided into measured activities — activities for which time standards have been set — and non-measured activities, jobs for which there has been no attempt to set standards. Each worker is required to report the quantity of work accomplished on measured activities — also the amount of time spent on the non-measured activities. These reports thus account for his entire productive time during the week, and give his supervisors exact knowledge of how well each worker is doing and whether he is carrying his full share of the work load.

Let's assume a worker reports that four hours of his 35-hour work week were devoted to specified non-measured tasks and two hours to non-productive time. Therefore, the balance — 29 hours — was devoted to various jobs for which standards have been set. By comparing his reported output on each job with the time spent on the measured tasks, the supervisor has an immediate picture of the degree of effectiveness with which the employee is working. By the same token, even on non-measured work, he has a good indication as to whether or not the worker is performing at a normal rate of efficiency. If the four hours of non-measured work were spent on a task which the supervisor knows very well could have been accomplished in two and a half hours, he can immediately call the employee in and find out why this time discrepancy has arisen.

In practice, each worker turns in a report each day on the number of units or operations he has processed in the measured category and this is multiplied by the time value assigned each job (which, of course, already has a 15 per cent fatigue factor built in). If the resulting time equals the time the worker actually spent on productive and measured work, then he is working at full efficiency, is meeting the standard. If on the other hand, he took six hours to accomplish tasks which, according to the assigned time values, should only

have taken four and a half hours, he is working at only 75 per cent efficiency, and can be interviewed by the supervisor to determine why the lag exists. It may be that the employee needs additional training; it could be that he has been misassigned. In most instances, however, it is simply that he has not been given enough work to do, and is stretching it out so he will not seem to be idling.

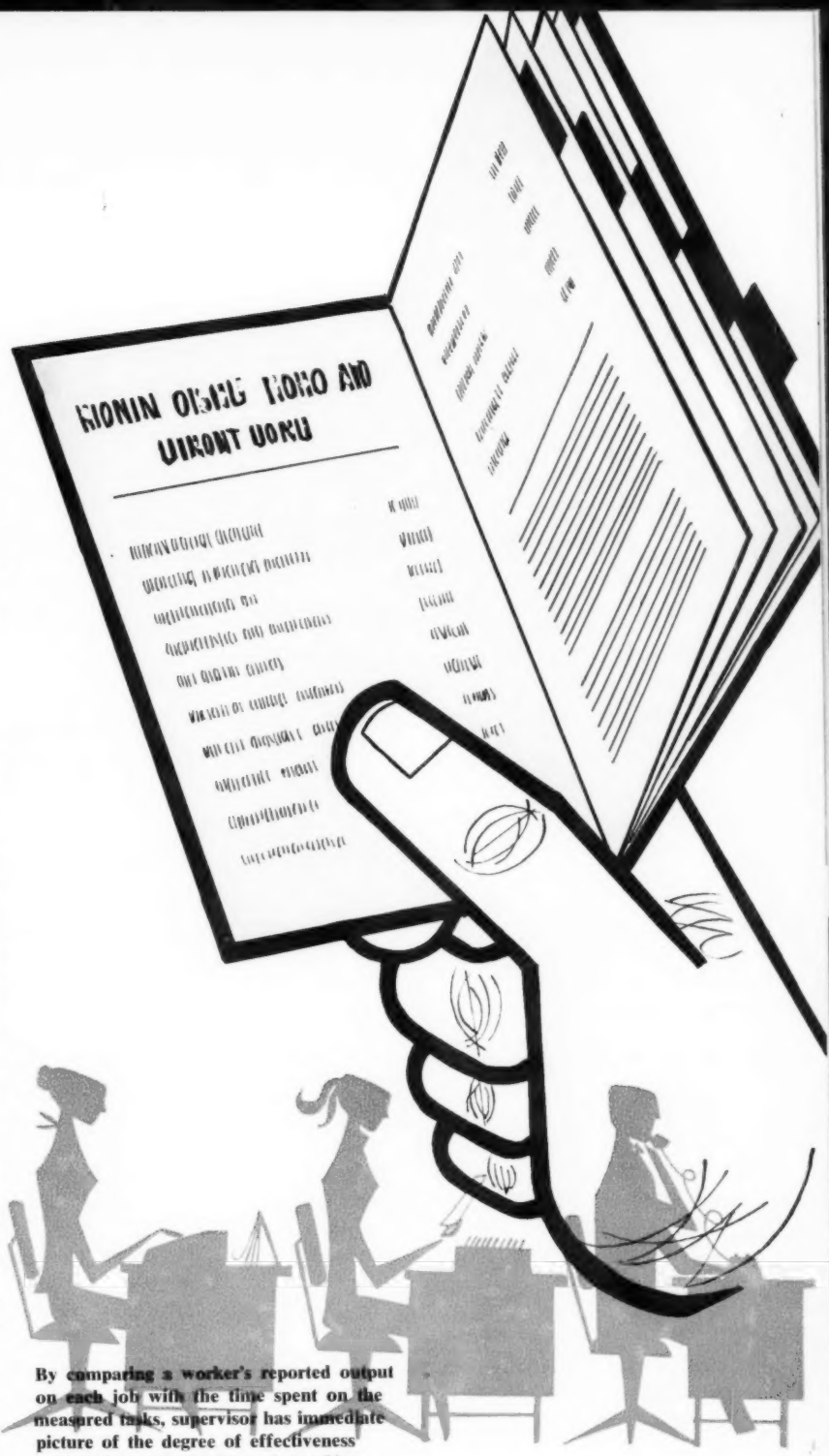
Supervisors alerted

In any event, supervision gets an immediate danger signal when any one employee is falling well below expected standards.

By use of a pyramid reporting system, this same principle is applied to every level of management. Supervisors get individual workers' time and quantity reports; thus, they can tell on a continuing basis whether each member of their group is performing at an acceptable rate. These individual reports are consolidated into overall group reports and relayed to the department manager, who can thus tell whether each of the work groups in his department is performing at par. Again, at the departmental level, reports are consolidated and sent to the divisional manager, who can see that all his departments are operating at a normal output. Finally, the division reports are consolidated and sent to top management.

Thus, in effect, there is established a continuous reporting system which follows the principles of management by exception, since each report in turn shows immediately whether the individual, group, department or division is producing work at an acceptable standard, or whether it is falling beneath the standard.

This reporting system is an essential part of a valid work measurement program, because it en-



By comparing a worker's reported output on each job with the time spent on the measured tasks, supervisor has immediate picture of the degree of effectiveness with which each employee is working.

Our costs were cut by seventy-six per cent . . .

sures that the standards, once established, will be adhered to. It also allows for immediate corrective action or investigation if any level which has at first met the desired standards later begins slipping below them.

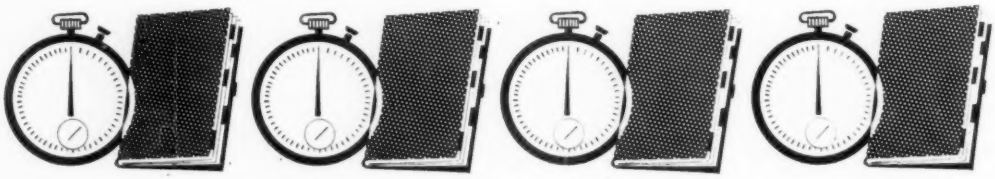
But the continuing report system also serves another vital purpose. It allows every level of management to project realistically what its staffing needs will be for anticipated changes in the company's volume of business. If a large new contract is won, for instance, management can look ahead and see just how new production demands implicit in the contract will affect the output requirements of each of its clerical departments. It can then make intelligent and reliable plans for adding staff, in the right numbers, at the right time, to make sure the necessary output can be accomplished.

The cost results

Perhaps a quote from a speech given before the American Management Association by Thomas R. May, chief accountant, Georgia Division, Lockheed Aircraft Corp., best describes and summarizes the results which can be achieved by a clerical cost control program of the type just described.

"During the first year of installation — a period when we had our heaviest costs including not only installation expenses but some maintenance and clerical costs, we experienced a savings ratio of 4 to 1. In the aggregate we estimate that the net annualized saving in our first year was over $3,000,000. During the second year we experienced an even better ratio. Whereas savings continued, costs — now representing the maintenance and clerical aspects of the program — were cut by 76 per cent, producing a ratio somewhere in the neighborhood of 16 to 1.

"In summary, we feel that we have achieved our original objectives. Not only do we have improved controls for budgeting and controlling clerical and other indirect-labor costs — controls which are of the utmost importance in a business where large volume swings occur very rapidly — but we have achieved significant cost reductions through systems and organizational improvements."



Developments must be used, not as excuse to create even more records, but as most efficient method of retaining the facts we must have

(*From page* 43)

as many as 12 document images, and 49 characters of code information—a total of 11,000,000 pages of documentary information, and 44,000,000 characters of alpha-numeric indexing code, for the single file. In original form this would require over 2,200 file drawers.

Miniaturization only one phase

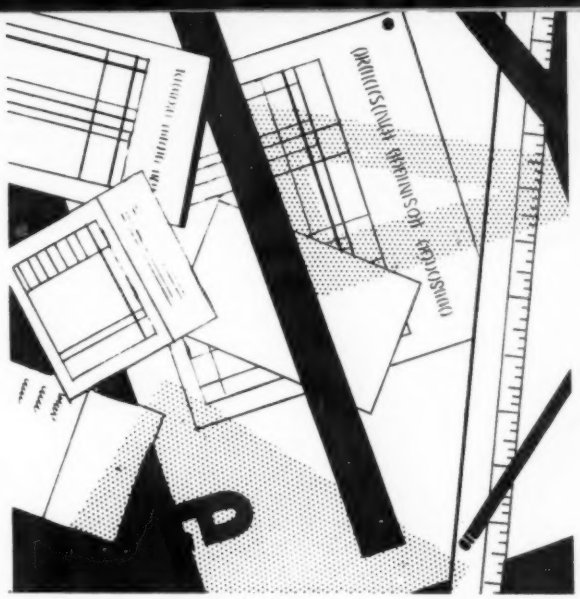
Yet miniaturization of basic documents, engineering drawings, ledger cards, insurance policies, etc. within a photomemory unit is only one phase of the new prospects opening before us. We are on the verge of devolping units that can file and retrieve voice communications, and that can accept a spoken query, translate it into identifying codes to locate the desired information, and reply verbally to the speaker's question.

And this emphasizes again the need to employ all the devices of information retrieval — miniaturization, the great possibilities of photomemory units, microfilm records in combination with computer memory, not as an excuse to create even more records, even more duplication of work, but rather as the most efficient method of retaining the essential facts we must have to do our work in the simplest and easiest form possible. Whenever possible, paperwork and every substitute for paperwork should be eliminated in favor of a simpler method of communication. Photomemory units can offer the great advantages of almost instant access to the important source documents covering any question or subject, but they must not be allowed to become repositories for endless duplications of the same data. Through their printing mechanisms, they offer even better possibilities than punched paper tape for reproducing automatically on forms all static information, so that only variable information need be entered by the human operator. But that should not lead to an endless multiplication of forms.

Let's, in other words, insure that our planning for these new and vastly useful machines that will develop so rapidly in the sixties does not result in using them as simple methods of doing more paperwork faster.

If we can get information on a microfilm viewer in our office simply by dialing the correct location number for the graphic record in the distant photo-memory unit, let's do that rather than demand that the unit print out a hard copy of everything for our use. After all, if we want to check back on any detail, we can always dial the number again and produce the necessary image.

Let's remember that the ultimate purpose of every technological development is the reduction of all paperwork, and clerical effort, all copying, and duplicating, and multiplication of reports and records, and forms, to the lowest possible point. Let's keep that in mind as the prime purpose of every goal in systems work. Let's insure that every effort we make is bent on providing the information we need in the simplest possible form in which it can be located, used, and then returned to storage until it is needed again.



What happens in a small company, which simply cannot find positions for displaced workers as a large concern can?

(*From page* 20)

(see article, page 40), in effect, offers a vast new automatic memory system to business and industry—and a system which can be tied into a computer location plan. In other words, computer memory can be used merely to hold the location numbers of the miniaturized images, and high speed automatic selection devices can then bring forward the microfilmed images of all the basic source documents bearing on the query put to the computer.

Thus, as these developments accelerate, the memory limitations of small computers will not present as much of a disadvantage as they might have at one time.

All these developments, however, spell greater and greater emphasis on the use of computers by companies of all sizes and therefore a multiplication of the number of problems that business must face realistically if it is to use these developments wisely.

There has been emphasis on the need for systems revision before computer installation, and growing sophistication concerning the ultimate usefulness of a computer as a regulating mechanism governing and coordinating all aspects of a company's operations, rather than as a processing unit serving each department's traditional ends, with no attempt made to coordinate those ends within the machine. Management has been alerted to this so thoroughly that it would be a very naive group indeed that would repeat some of the early mistakes of poor planning, and stereotyped applications.

The personnel picture, however, is far more complicated—because comparatively little is known about it. The very facts that computer installations in the past have been comparatively few, have been generally made in large companies highly conscious of public relations, and have also occurred in relatively prosperous concerns which were expanding their activities anyway, has certainly cushioned the displacement difficulties caused by the computer.

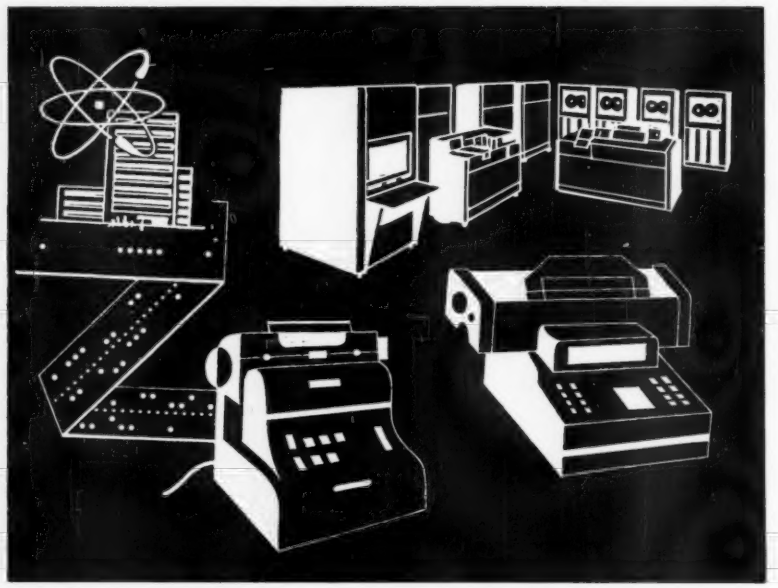
But what happens in a small company which cannot simply find places for displaced workers as a large concern can? There is bound to be some displacement in some department or departments, if an efficient installation is made. After all, even though a computer's main purpose is not necessarily to achieve economies in terms of operating salaries, it inevitably will take over tasks formerly done manually, or through simpler machines requiring a battery of human operators.

To take a very concrete example of just what a computer can accomplish in terms of eliminating existing jobs, one need only review the global inventory control system centered in a computer installation in St. Louis, recently inaugurated by the Army's Transportation Material Command.

The Transportation Material Command is responsible for supplying all parts needed for all Army aircraft, helicopters, harbor craft, and railway equipment. In addition, it serves the parts needs for sizable portions of the Navy and Air Force's transportation equipment. It also serves nations participating in the United States Military Assistance program.

TMC's inventory covers 300,000 separate items, and St. Louis receives about 1,000 requisitions per day from military installations in all parts of the world. It is the job of the TMC headquarters in St. Louis to process each of these requisitions daily, and to ensure that the needed parts move out of Army depots to the requesting point as quickly as possible.

The new automated system evolved for doing this is based on an IBM 705 III data processor at St. Louis, which carries within its "memory" all the records



Centralized installation completes 10,000 transactions a day, and updates all records for each

formerly required by the six operating departments of the Command—the Directorate of Engineering, the Directorate of Cataloging and Identifying, the Directorate of Materiel Requirements, the Directorate of Procurement and Production, the Directorate of Centralized Depot Supply Activities, and the Office of the Comptroller. Under the former system, each of these directorates was responsible for one phase of the Army supply system, and so had to have a complete set of records of its own. Now all records are integrated within the computer, which each day updates all operating information for each of the six interlocking directorates of the command.

What the computer does

Thus, the master tape file within the computer carries all the necessary records of maintenance engineering; cataloging and identification; materiel requirements; procurement and production; depot supply activities; and accounting.

During daily processing, the computer automatically updates all six sets of records on every item affected during the day's transactions.

Basically, the system works in this fashion: an Army base, anywhere in the world, that requires a spare part will radio its request to an Army Overseas Supply Agency in New York, New Orleans, or San Francisco. The agencies in turn transmit the order by leased telephone wire to headquarters in St. Louis. The requisition, received in the form of a punched card on an IBM Transceiver, is fed into a Card Reader which converts the requisition into the form of magnetic tape for computer input. The tape, when read into the computer, is processed against the information stored there to issue the necessary shipping orders, and also to make the necessary changes in the computer's memory to lower the inventory level on the desired item by the quantity being shipped.

Thus, if an air base in Germany requests through New York a certain number of airplane engine parts, the computer will automatically check on its records the availability of these parts at the Army Storage Depot nearest the requesting point (New Cumberland, Pennsylvania), and, if New Cumberland has a sufficient quantity of the needed parts, issue shipping orders in the form of punched cards for direct transmission to New Cumberland. It will also automatically reduce the recorded inventory level of the particular part on its records for New Cumberland.

If the check within the computer shows that there are not enough of the required parts at New Cumberland to meet the requisition, the machine will automatically check the inventory level at the next Army depot closest to the requesting point in Germany.

However, while these are the basic computer operations, it actually does a great deal more in filling any given request. Suppose a particular aircraft part has been declared dangerous. If the requesting base enters a requisition for that part, the computer will automatically cancel the request, and order transmission of the correct quantity of the new part specified by the Army to replace the bad unit. On the other hand, if a part is merely obsolescent, but still usable, the computer, even if given orders for a newer part, will exhaust stocks of the old but still workable part before issuing orders for transmission of the new one.

The centralized installation completes 10,000 transactions a day, and each day updates its master file on all the changes that have occurred as a result of the transactions. It also provides the Command's six operating directorates with the action reports they need to meet their responsibilities:

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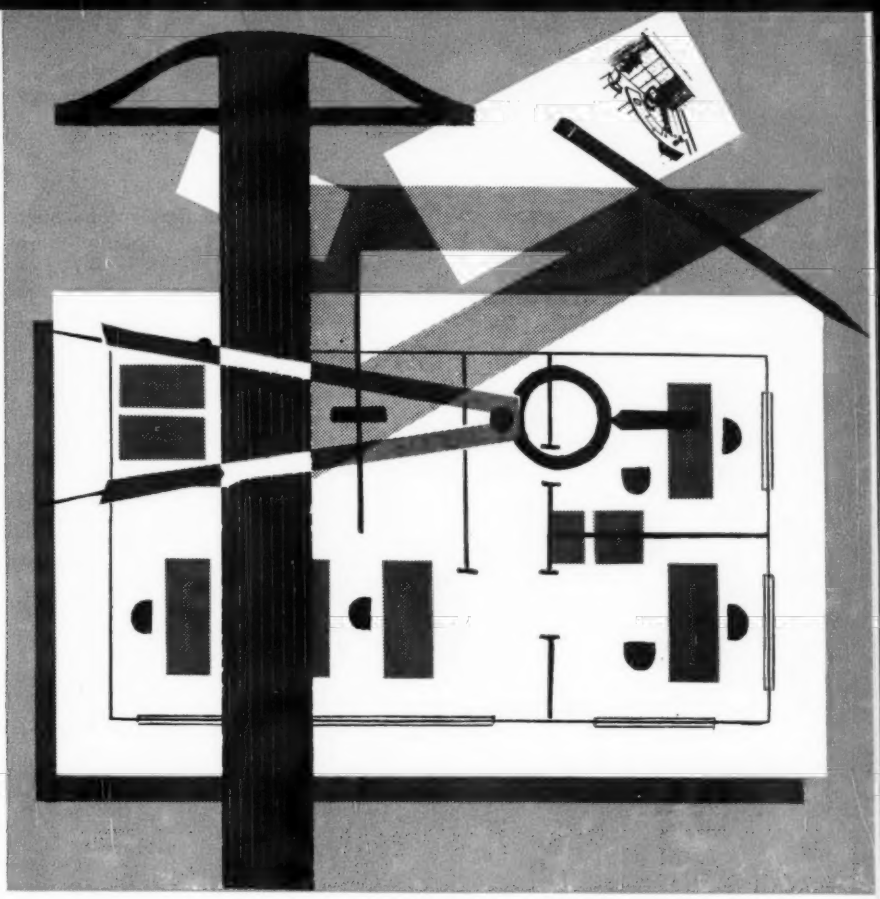


OFFICE DESIGN

Perhaps the most obvious of the many dramatic changes that have taken place in the office during the past ten years has been the transformation of its appearance. Once utilitarian, it remains functional but has added the new dimensions of individuality, attractiveness, color. Less apparent, but equally significant: the important advances in flexibility, and utilization of interior space.

Cost Cutting Ideas for Your Office...

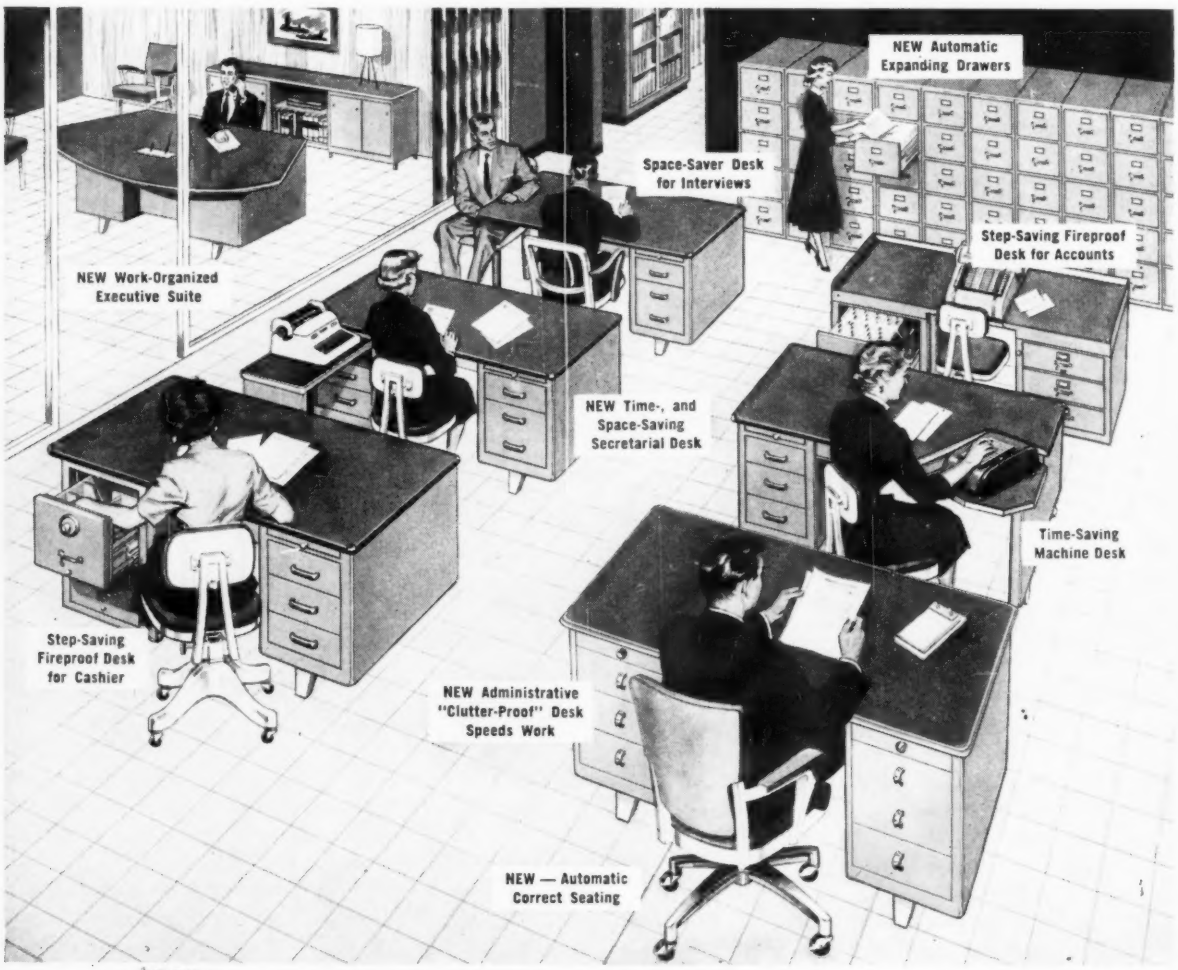
COST REDUCTION, a vital problem in all divisions of a business is nowhere as challenging as in the administrative departments. Office costs, having trebled during the past decade, are today *of primary concern* to top management.

It is in the record that since 1899 Shaw-Walker has been equipping business with "time-engineered" office facilities as inventive and ingenious as American production techniques, — that Shaw-Walker equipment and systems *have cut office costs*, saved floor space and made offices more livable.

For today's *cost-conscious* management Shaw-Walker "time-engineering" research has now produced — The work-organized "clutter-proof" desk; Automatic expanding file drawers; Step-Saving Fire-Files and fireproof desks that protect records at point-of-use; Labor-Saving equipment and systems for tape handling; Error-Proof filing systems; Automatic correct seating chairs; Time-Saving payroll plans; and Numerous Other Devices that facilitate recording, filing and finding of records.

Some of these "*cost-cutters*" are pictured here. All are in the 252-page Shaw-Walker Office Guide.

Throughout, descriptions plainly state economies you can expect from Shaw-Walker "time-engineered" equipment and systems. *Free to Management when requested on business letterhead. Write Shaw-Walker, Muskegon 57, Michigan.*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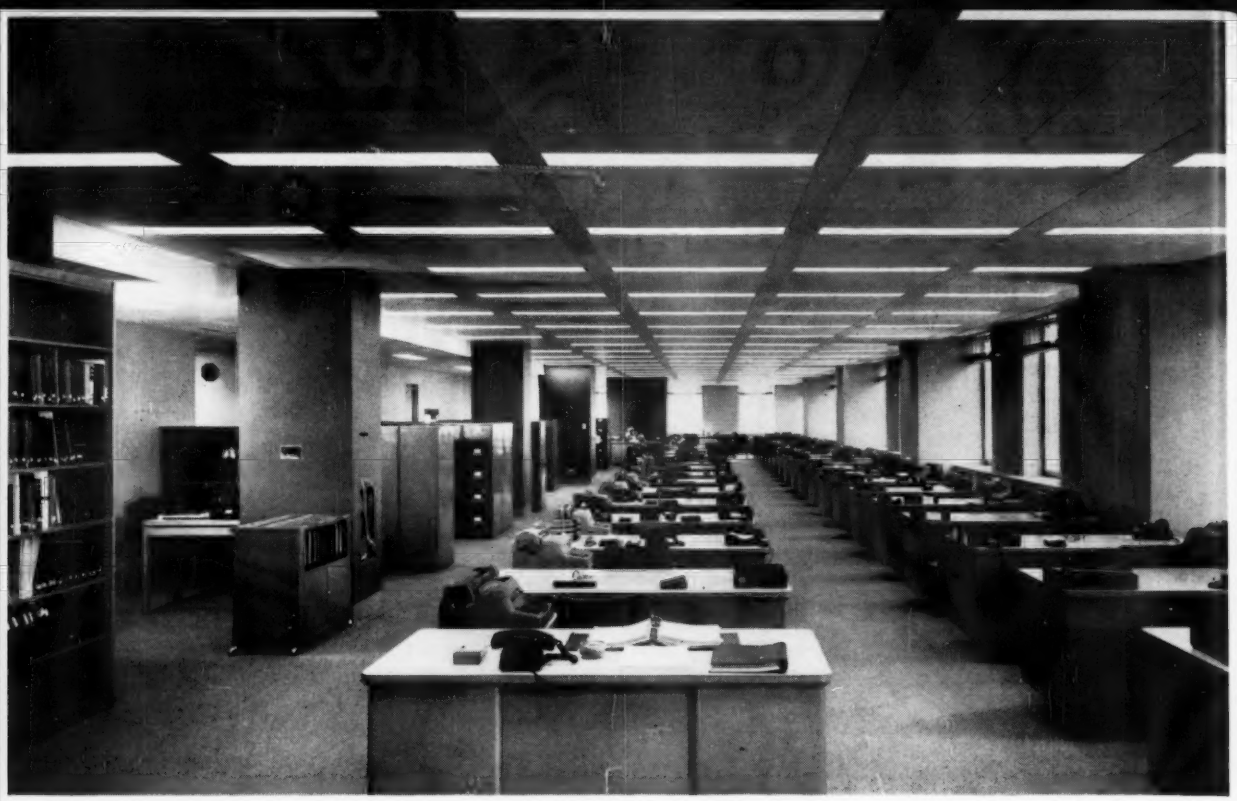
SURVEYS, PROGRAMMING HOLD KEY TO OFFICE PLANNING IN THE SIXTIES

By J. GORDON CARR, A.I.A.
J. Gordon Carr & Associates, New York

THE 1950's saw the acceleration of major trends in office planning which began in 1946 as a result of air conditioning in all new buildings. This changed entirely the size and location of usable areas, and consequently the shape of buildings and planning. It made interior space habitable. This in turn created the need for better lighting. All these added up to psychological problems that had to be overcome; answers that had to be found to the multitude of structural problems created by such drastic changes. This led to new concepts in planning, new types of partitions, and new materials through the fifties. It has been a logical progression — and a steady one.

Another factor that has influenced office planning in the past decade is the tremendous increase in business tempo, and management's awareness that a dollar saved on overhead is just as good as a dollar saved on the production line. In the competitive situation today, it is often easier to get that dollar by savings on overhead than by profit

Efficient conference room, with Miro mural, in Seagram Building, New York, epitomized office planning in the fifties.



Above is example of contemporary open space planning. Carpeting and acoustical ceiling keep sound level low even when many machines are in action.

"Management has grown more reluctant to take on area for which there is no clear cut use in the future. This can be a mistake."

on increased sales, and the office is now recognized as an area where every improvement can pay off handsomely. In 1900 there was one office worker for every 30 in the plant; in 1930 one for every 10, and in 1958 one for every 2.2.

Management learned during the 50's that careful planning and equipping of the human machine in the office needs the same degree of care and thought by experts as does plant planning and equipment. And it has come to realize that even though the cost of producing an office facility is great compared to old concepts, yet the largest cost item by far is the payroll of the workers employed in the office.

If betterment of facilities will increase the efficiency of the users even a small bit, management is finding it well worth while to make these improvements.

This has an additional benefit. Competition for good people has become more and more severe during the fifties and remains an acute problem today. More and more the prospective employee selects the company rather than the other way around, and the quality of the office plays a great part in this selection . . . another reason for the great trend toward emphasis on comfort and decor.

The type of buildings housing our offices during the past decade have been changing too. With the high cost of construction, emphasis has been given to getting the most out of every square foot. New concepts of structural design are raising costs, and the mechanical plant has increased from where it formerly represented 10 per cent of the total cost of structure to where it now is often 45 per cent, and going higher.

Great advances have been made in module design during the past ten years, and every new building sees increasingly ingenious solutions to these problems. Today, we have excellent module units for partitions

with which you can do almost anything. Ceiling construction to fit the same modules is possible, and lighting units and air-conditioning outlets are designed into the ceiling module.

Good flexibility for moving and reusing all the items that make up an office layout is the most important single factor in office planning which our office pioneered during the 40's and early 50's. This is even true before initial construction because in the design stage, changes are constantly being made, and the farther along the project is, the more costly the change — even on paper. A good module system usually makes such changes easier in planning as well as in construction.

Another important advance in office design is the method of approaching such design. No longer is it a hit or miss proposition. Rather, enlightened management is now realizing the value of a thorough survey. It brings to light unknown or unrealized situations; it brings out dormant ideas of organization; and it often is the "catalyst" to far reaching action. It is not uncommon to have a company, halfway through the planning stage, suddenly decide to reorganize departments, and sometimes subsidiaries — or even bring a merger to a head.

Management is finding that careful surveys give it a working picture of relationships. Surveys are fundamental to setting the program, and thus, to planning. The recorded information and data become the "Bible" on which all planning is based—not so much information that it defeats its own purpose, but vital information as a reference point at every stage of the plan development.

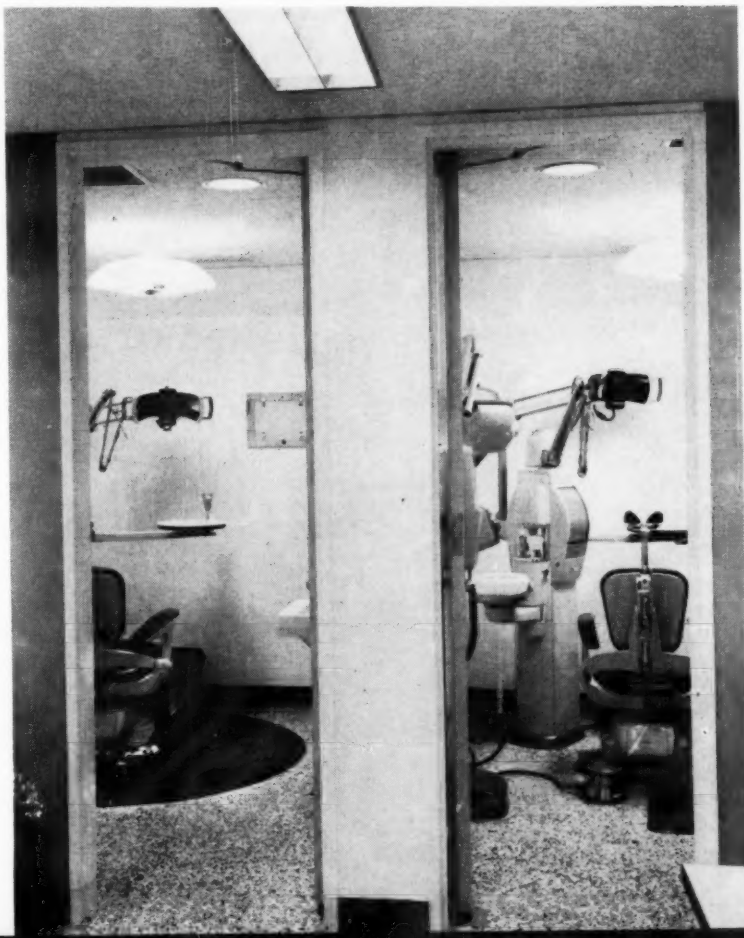
Here is one of the best tools for helping keep down costs. Or putting it another way—lack of a good program can result in very high costs throughout the project.

Due to rising rent rates during the 1950's management has grown more reluctant to take on area for which it can see no clear cut use in the

(*To page* 167)

Architecture of fifties produced stately Seagram Building.

Most large companies today "must" have medical facilities.



BUY OR BUILD? OWN OR RENT? IT ALL DEPENDS UPON THE USER

Author says office space is "good" or "bad," high-priced or low-priced, only after needs of occupant are projected into it

Office building in Philadelphia's Penn Center exemplifies newest structural design.

By R. K. GAD, Jr.

Director, Office Planning Division, Shaw-Walker Co., New York.

AMERICAN BUSINESS uses air mail and air freight after careful study of the benefits in time, inventory reduction, customer service, etc. It substitutes horsepower for manpower after considered evaluation of potential gains. It travels by jet and sleeper rather than mule and stage coach. Yet, in many cases it buys, builds and rents office space as though it were a game of "Blind Man's Bluff."

Acceptance of our concept of space evaluation, which we have been advocating for the last decade, has gradually gathered momentum and we look for even greater acceptance in the next ten years.

Stated briefly, the concept embodies the following premises:

a. Office space is proved good or bad, cheap or expensive, ideal or makeshift, only after the particular space and other needs of the potential user have been projected in it. Those other needs can range from:
   Aesthetics
   Community good will
   Company "front"
   Efficient production
   Employee relations
   Financing
   Initial cost
   Maintenance
   Publicity
   Saleability
   This list is deliberately alphabetical since no two "experts" could agree to their relative importance. It is applicable to both owned or rented space.
b. Measurement by comparison of

footage costs is completely fallacious. How much is the rent per square foot? How much a foot did the building cost? The answers to these questions are erroneously used to compare space for rental or construction. The Public Buildings Service of the Federal Government even advertises for competitive bids based on cost per square foot. Yet price per square foot is worthless for comparison until the space is balanced against requirements. If the prime requisite be housing, per capita cost is the only comparative factor that can be used.

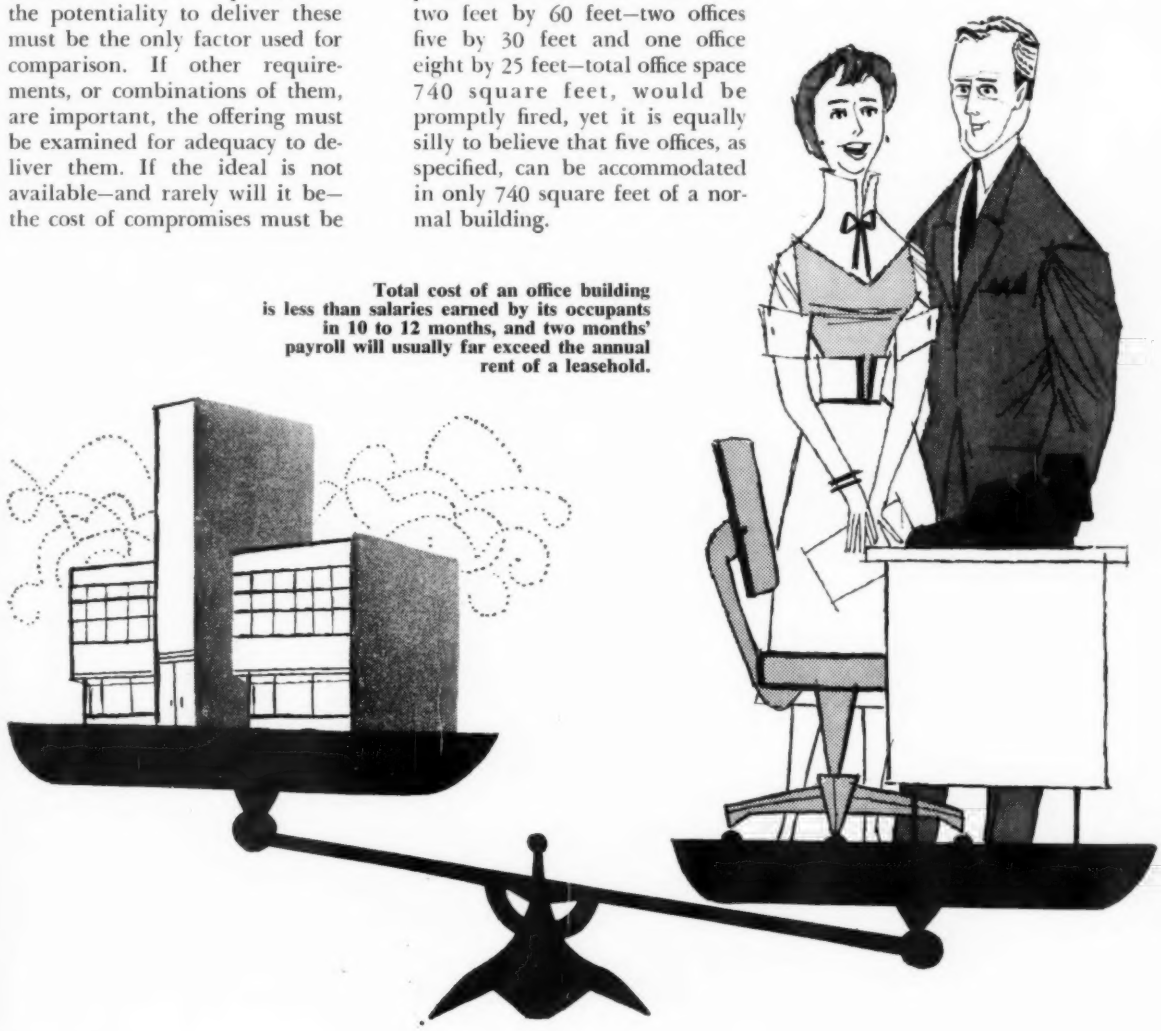
If economy and efficiency be foremost in the requirements, the potentiality to deliver these must be the only factor used for comparison. If other requirements, or combinations of them, are important, the offering must be examined for adequacy to deliver them. If the ideal is not available—and rarely will it be—the cost of compromises must be tallied. If these factors are carefully considered and a conclusion is definitely reached, rent or building costs will have surprisingly little bearing on the decision.

c. Measurement of space by volume rather than shape has little or no basis in fact. To prove the fallacy of measurement by volume rather than shape one has only to examine the so-called formula or standards approach in writing specifications for occupancy. Typical would be, "needed—two offices of 120 square feet each—two of 150 square feet each and one of 200 square feet —total 740 square feet." The planner who delivered two offices two feet by 60 feet—two offices five by 30 feet and one office eight by 25 feet—total office space 740 square feet, would be promptly fired, yet it is equally silly to believe that five offices, as specified, can be accommodated in only 740 square feet of a normal building.

d. Rent or cost of occupancy is such a small percentage of overall office costs that it should, by itself, never be used as a measurement. The reason being that the total cost of an office building will be less than the salaries earned by its occupants in 10 to 12 months, and two months' payroll will usually far exceed the annual rent of a leasehold.

Communication, or the lack of it, we are told, is a major cause of divorce, international strife, wars, both hot and cold, and the mounting death toll on the highways. But we *know* it makes its presence felt in the profit and loss statement.

Total cost of an office building is less than salaries earned by its occupants in 10 to 12 months, and two months' payroll will usually far exceed the annual rent of a leasehold.



Two common barriers to good communication: too little space, too much space.

Therefore, communication should be a major consideration in any office plan. Yet, too often it is not. The same company that spends both the time and the money necessary to plan a plant to wring out every unnecessary footstep will blithely assign the southeast corner to the boss because it has the best exposure, and will put the vice president for sales three floors away from his group so he can have a larger office with one extra window, or put the mail room on the 12th floor, and the stockroom on the 16th floor to use up slightly inferior space, even though they are operated by the same personnel. This sort of compromise may save ten cents in rent for every dollar wasted in payroll.

Two of the most common barriers to good communication are man-made and self-imposed. They are (1) too little space and (2) too much space.

While communication is neither

Manhattan office buildings—all sizes, shapes and ages—house thousands of companies, big and small.

Past decade has seen millions of city dwellers escape to the suburbs. Some companies followed.

Large, open work area spaces desks comfortably apart, at "good communicating distance."

easy nor good in the chaos of a poorly planned, overcrowded area, it can be even worse and more costly if attempted by today's people in space acquired for tomorrow's needs. You cannot expect the two-year-old toddler to perform at his best in six-year-old size shoes bought on the theory he will eventually grow into them. It is equally true that while no planner worth his salt would compromise a layout just to save space, he must be as meticulous to keep communication easy by avoiding excessive space. In an office, double the necessary space doubles the problems, in spite of the past ten years' progress and that anticipated for the next ten, in telephones, chutes, tubes, etc.

In the past decade there has been a rush to the suburbs. Several large companies, after adequate study, decided to move, and succeeded in getting much publicity in trade papers and magazines. This stimulated others to follow suit. Unfortunately, the followers neglected to analyze all their requirements, and found after the move that the suburbs, while solving some of their problems, created others that were not calculated at the time the decision was made. Rental costs and taxes were given precedence in one case where actually a city location was necessary to get orders. The result—a drop in business volume that was almost disastrous. The cure—an additional office had to be opened in the city.

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THE REVOLUTION IN OFFICE INTERIORS -- HOW IT HAPPENED, WHERE IT'S GOING

Economics and changing character of American business have produced an office far different from its predecessors

By GERALD LUSS
Vice President and Design Director, Designs for Business, Inc., New York.

ANY REVIEW of the office of the 1950's must be phrased in a new idiom—none of the concepts and language previously familiar and valid to it can apply. This office of the 50's, created out of open floor space through technological and human engineering, through controlled, coordinated planning and design, has no precedent in history. Hence, it is not a matter of comparing prewar and postwar offices but rather of recognizing the emergence of something entirely new.

By now much of this "new" office has become a familiar part of business vocabulary and attitudes. So much so that it is hard to believe it all happened within one short decade. We take for granted air

Trend in office decor of fifties was toward light look as reflected in office above.

Picture at right illustrates the principle of modular flexibility. ▶

Soft lighting in 25th floor executive offices of new Corning Glass building in New York shines down from recessed panels (not shown) over table, and through Fiberglas draperies along the rear wall.

Office interiors: prospects for the 60's

conditioned space, automation and electronics, fluorescent lighting and luminous ceilings, acoustical control and movable walls, and the many other features of the postwar office which have no prior experience in history.

However, in looking ahead to prospects for the 60's, it is worthwhile to recount some of the basic reasons that inspired the modern type of office operation in the first place. None of it was by chance. Nor was it just a natural consequence of great technological advances made during the war.

The main factors behind the development of the modern office operation lie in economics and the evolving character of the nation's business and industry. The office, which for a century ran second to

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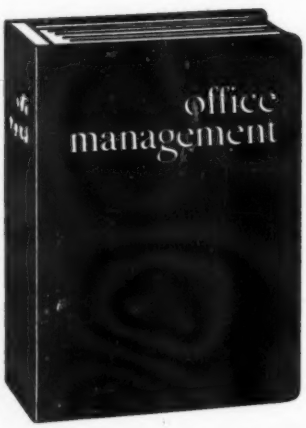

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Conference room stands adjacent to executive offices on Corning building's 25th floor. Wood table is handsome, functional.

Work area for Corning president's secretary shares same well-lighted, clean-looking, foliage-decorated interior.

the large plant and mill, has, in the postwar period of the last decade, moved out front to take first place. This fact is dramatically signalled in government statistics from the Department of Labor: "The White Collar category, comprising over 40 per cent of the total labor force of the nation, now outranks the Blue Collar category . . ." And this change has not been gradual. It has been one of an increasing acceleration that will show up even more strongly in the next ten and twenty years.

It is clear then, that office activities — merchandising, selling, billing, filing, accounting, public relations, advertising, etc.—came out of the war so much broader in scope and so revolutionized in complexity that they needed, not only a major part of the nation's labor force, but entirely new techniques and systems of work, as well.

Furthermore, the increased cost of all of the elements associated

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Office interiors–

(*From page 65*)

with the modern office–rental, personnel, equipment, moving to new space, construction, etc.–requires a new kind of *utilization* of office space that is both efficient and economic.

Once, for example, it was a messenger's responsibility to take care of interoffice memoranda and order slips. Today, in many instances, this is handled by pneumatic tubes, conveyor belts and other automated devices. Once a filing cabinet was sufficient for storing papers and letters. Today many offices require filing systems that are highly categorized, housed in mininum space and easier to get at and work with. Once voice communication was a matter of calling across a room or picking up a telephone. Today it is a highly organized system involving all types of electronic devices, including advanced telephone and teletype units. Once "climate" was a window thrown open in summer and a radiator turned on in winter. Today it is a complex system of air conditioning ducts and units required for the office's greatly enlarged staffs as well as its enlarged facilities. And we can paint similar pictures for the past and present for many other aspects of the office, including lighting, acoustics and space planning.

These changes are the reasons for the development of new equipment and improved work systems in the office of the fifties. They are responsible, too, for the appearance of the office interior specialist whose skill and knowledge in planning, designing and coordinating has made him a necessity for the modern office.

Emphasis on flexibility

But perhaps the most important factor in the office of the postwar period has been flexibility. This was a factor that preoccupied the alert interior designer who could foresee that the changing nature and structure of the office–its enlarged personnel staffs, its increased business activities–plus continuing developments in automation and electronics, and a rise in the number of long-term leases would require facilities that could adapt to these changes with the greatest economy and efficiency.

The movable–or flexible–partition became an important element as it was realized that the office had to be able to expand or contract or change the layouts of offices and work areas, as work needs changed.

During the early stages of the postwar period, we borrowed the standard movable metal partition from factories and warehouses which, long before, had faced a need for flexibility. To adapt these standard partitions for office use, we introduced the manufacturers to a more contemporary design approach so that they would be more esthetically acceptable. It was a successful move; the partitions could be dismantled and reassembled with much more salvaging and reusing than was true for the usual type of plaster wall.

However, while it was possible to take down this movable wall and set it elsewhere, other problems remained. What of the ceiling, the lighting, the acoustics, the air conditioning, when this partition change was made? These had to move, too, in order to accommodate

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Today's executive office often reflects personality and interests of its occupant. Picture courtesy Dukane Corporation.

OFFICE FURNITURE DESIGNS MAY CHANGE BUT MATERIALS (and Competition) REMAIN

By JOHN M. SINE, Associate Editor

WOOD, METAL, SYNTHETICS – which will be dominant in the "executive suite" of the sixties? The decade just concluded saw a great many changes take place in office furniture and furnishings – in the whole concept of office design itself. Dramatic uses of color, cleaner lines, an emphasis on the "decorative and functional" rather than the functional only–these were some of the innovations in office furnishings during the fifties.

But if design concepts changed considerably, the popularity enjoyed by the two basic materials that have always dominated the furniture field did not. Nor did the competition between them. Wood and metal continued to vie for first place in the executive office. This long-standing competition between wood and metal furniture manufacturers can be expected to be even sharper in the next decade, if business expands as widely as is currently predicted, bringing a raft of new executive offices into the picture. And with continuous new developments in synthetics and other

This highly styled executive desk, a product of the Art Metal Construction Co., incorporates color in contemporary combinations.

The trend is toward "dignified informality." The austere man behind the desk is passé.

materials, wood and metal producers will face much more than competition from one another.

Threatening both camps is the new concept of furniture which uses wood and steel together, or replaces it entirely. Plans have already been made for an all-synthetic line of furniture; aluminum, too, is being heralded as an important furniture metal.

One manufacturer has introduced a line of office furniture consisting of solid molded plastic over a steel frame. The plastic covering will wear far longer than wood over a period of years, the company asserts, with the pattern or color beneath remaining untarnished. Another manufacturer has brought out a steel desk which has a wooden top, anodized aluminum stripping, and plastic laminate panels; moving parts are made of nylon, steel, and plastic.

Aluminum recently moved strongly into the spotlight by virtue of twelve new designs submitted by Kaiser Aluminum to office furniture manufacturers for future consideration. Two of the designs have already been reported successful in the prototype stage and production of these models could occur within the next year. The designs are unique, if not startling, in concept, and call for the use of aluminum as the basic material; wood and plastic are to be used liberally. Frank Q. Hershey, manager of industrial

Although an example of the wood tradition, this executive desk from the Macey Fowler Co. embodies distinctly modern design.

design for Kaiser, reports that the new designs were based on a "reform" taking place in executive office furnishings. The trend, he says, is moving toward "dignified informality. The day of the austere man behind a massive desk is giving way to an unrestrained atmosphere in which the executive meets his caller on a common level around a congenial furniture grouping."

Innovations, designs, or reforms notwithstanding, it would be difficult to envision the exclusion of wood furniture from the executive offices of the sixties. Wood remains the richest and most individual of furniture materials – characteristics which take on added prestige value as business grows larger and more

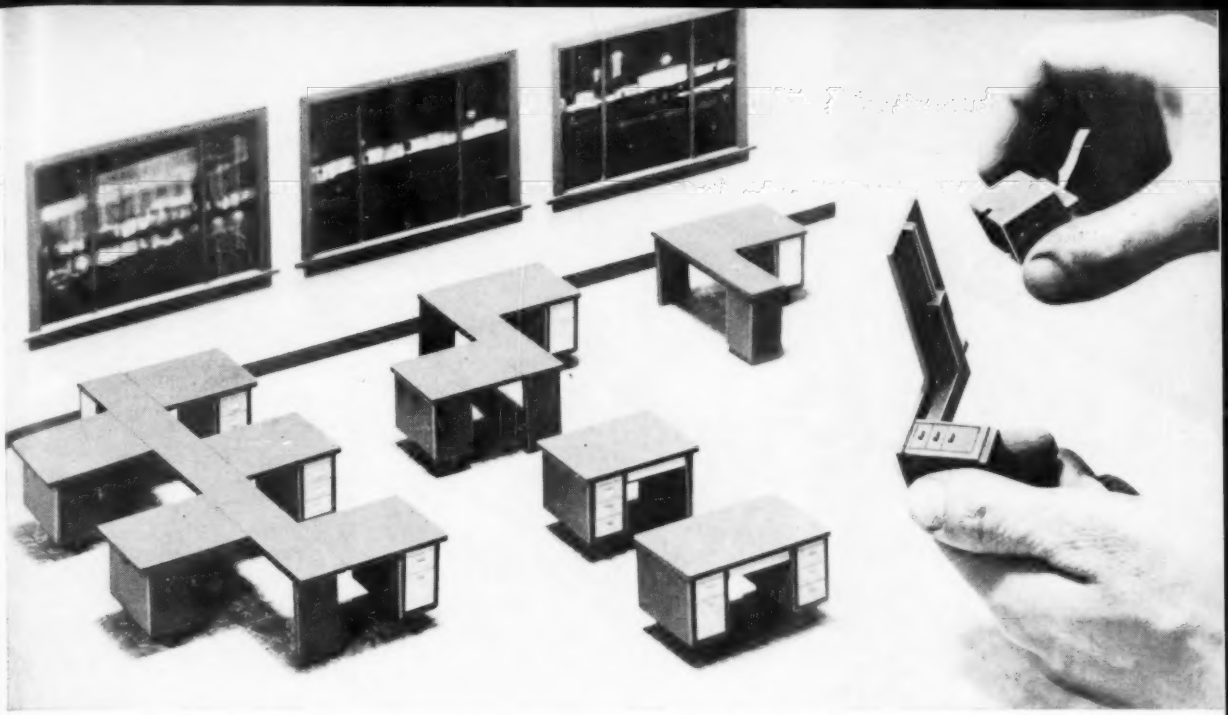
This modernized version of the roll top desk is a product of the Myrtle Desk Co.

In 60's, management will depend more and more on the office furniture dealer, the manufacturer's representative and interior designer, for help in choosing good furniture.

Executive posture chair by Sikes.

Remington Rand's Aristocrat modular furniture is displayed in setting designed by Michael Greer.

A highly functional, dual work station at the Corning Glass Works, Big Flats, N.Y. Equipment is by Yawman & Erbe.



The Globe-Wernicke Techniplanner kit—scale model desks, chairs, partitions—gives visual aid to planners.

This desk from General Fireproofing's 1000 Series is available in four decorator colors.

impersonal. Because of its rich texture and tradition, and the fact that it can be custom designed, it is often said to have many more advantages than steel. But critics of wood furniture have a rejoinder. Metal, they say, can offer color—and bold use of color has been a distinguishing characteristic of forward looking corporations and avant garde decorators.

All of this, then – the new developments and stronger pressures from furniture manufacturers –means that the new executives the sixties will give rise to are going to face a battery of designs, colors, styles, and materials. And, in all probability, they'll be turning more and more to the office furniture dealer, the manufacturer's representative, the interior designer, and others involved in planning and furnishing the office to help them in their choice.

Here, for the benefit of the "man of the sixties," are some facts on the sources mentioned above which should be considered when he moves into that "executive suite":

Office furniture dealer will service your office.

He combines knowledge of aesthetics and systems.

The office furniture dealer (more often called the office equipment dealer) and the manufacturer's representative can offer discerning professional advice in the design and layout of the office. The office equipment dealer generally carries a variety of furniture in different grades of wood and steel, along with accompanying modular units and credenzas. The manufacturer's representative will show you the particular line his home company produces.

The first step

The very first step in your buying effort should be a visit to several dealers' or manufacturers' showrooms. Here you can determine the quality of the material, the price, and the design or decoration services available with the purchase.

The dealer or representative may have an interior decorator on his staff who is capable of coordinating the entire office decor with a new purchase of furniture. He may have a layout planner too, who is skilled in work flow arrangement in the office. You might ask: "What does a representative or a dealer know about, say, the petroleum business?" The answer is that the space planner can work as easily in a petroleum refinery as he can in an advertising agency.

Many firms have found the service relationship established with the dealer or representative invaluable after the purchase has been made. What service is needed with a sturdy metal desk? It may require none. On the other hand, you might want to use it in another part of the business where its internal parts—drawers, typewriter, pedestal, etc.—may have to be altered. The dealer or representative will know how to arrange it.

The office equipment dealer, as the title implies, can also furnish a variety of office machines, and the supplies needed for the overall office operation. He is, in summary, a person who cares about servicing your office. He is not primarily concerned with aesthetic appearance, even though he may deal in beauty, nor is he a fervent "systems" man, even though he is capable of giving you an efficient plan of work flow and work stations.

Express your desires

Buying office furniture most often accompanies the redecoration of the executive office. There are many people capable of carrying out the complete project—from the design of the office to the purchase of furniture and appointments. The interior architect, the interior decorator, and the interior designer—all are well-versed in the activities involved in "creating" the executive office. The three may work independently, or they may be found on the staff of the office equipment dealer, the manufacturer, or the architectural firm. They are the people concerned with the office from an aesthetic point of view. Their aim: to create an office which is pleasing, comfortable and, in some instances, a "showpiece."

The ideas of the decorator (a name we will use for convenience to denote the three artists) are not always in accord with those of the business executive—they may sometimes be considered startling and unorthodox. The decorator, in turn, will sometimes be deliberately startling and unorthodox merely to stir up what he feels is the "reclining" personality of the man he's dealing with. This, though, is not the case generally. A productive relationship between businessman and decorator is not only possible, it is usually the rule. And if it isn't in some cases, it could easily become so. The often-heard admission, "I don't know a thing about color" is one which frequently accompanies the executive's suspicion of the artist.

A more productive admission on the executive's part would be "I don't have the ability to coordinate my tastes into a smooth office design." Through this attitude, the executive establishes his limitations in an alien field without endangering his personal integrity with the decorator. If your tastes dictate an office reminiscent of Colonial Williamsburg, don't hesitate to say so. With this knowledge, the decorator has a sound and mutually acknowledged idea of what you want. Your choice may not be happy from the decorator's point of view, but after all, he won't have to spend his working hours in his creation—you will. However, if you overrule the decorator on every point without really paying any attention to his suggestions, you're simply paying for professional services you're not getting.

Custom designs

We have been discussing the type of decorator who is used to working with the executive. Upon initial contact, he will present a portfolio of jobs he has done in the past. From this you can judge whether or not he displays capabilities you are willing to trust. If you accept his services you may expect prelimin-

Proposed for the future is the "Satellite" desk in brushed aluminum. From Kaiser Aluminum's industrial design department, the specifications call for a top of aluminum sheeting covered with metallic leather, with a writing area of clear lucite.

ary sketches for your comment and possible approval.

As the planning stage ends you should have a complete visual picture of how your office will look; final color sketches are generally accompanied by swatches of fabrics to be used in draperies, floor and wall coverings, and furniture upholstery.

The furniture may be designed by the decorator and built by a custom craftsman if you so desire. This procedure is sometimes followed where price is of no consideration. There are also wood and steel desks manufactured in quantity, which bear every appearance of having been designed and built by custom craftsmen.

The executive's domain was not the only area in the office to feel changes during the fifties. Work areas, in many companies, were made more colorful and relaxing; furniture, in many instances, developed from the sturdy and practical to the highly decorative as well. And, in the past few years, a noticeable emphasis was given to the "work station" concept. Some companies feel that this emphasis will be even greater in the years to come.

Work station not new idea

The work station is not a new concept in office management. It has existed since that early time when the clerk mounted his high stool and remained there for a solid twelve hours of copying. Essentially, it means the application of industrial production techniques – time and motion-saving techniques – to the office situation. A work station is occupied by a "production employee"—a person whose job does not vary greatly from day to day, and who is expected to become highly proficient at repetitive routines.

Several companies have adopted the following rules for the work station which, they say, can obtain the production from an hourly rated worker with a minimum of dissatisfaction:

1. The work station shall be organized so that the tools used most frequently are handiest.

2. The worker must not be subjected to unnecessary fatigue.

3. The work station must be located properly in relation to the source from which the work comes and the place to which it must next go.

4. The work station must not occupy more space than is needed for efficiency.

These instructions do not make up the blueprint for a "mechanical systems monster," companies insist. The work station exists only for the person working in it, and by it; it does not exist as a business entity. A static or inflexible work station, a desk or chair, for instance, which works against rather than with the worker, has a detrimental effect on employee morale and eventually production, companies add. In the *Handbook for Supervisors,* by Ecker, MacRae, Ouellette, and Telford, the effect inefficiency can have on the employee is well stated: "Inefficient plant conditions are sources of constant frustration to the worker. He sees his efforts being constantly thwarted by a condition over which he has no control and so loses much of his interest in trying to operate an efficient shop or department." The authors continue to point out that the unhappy,

(*To page* 171)

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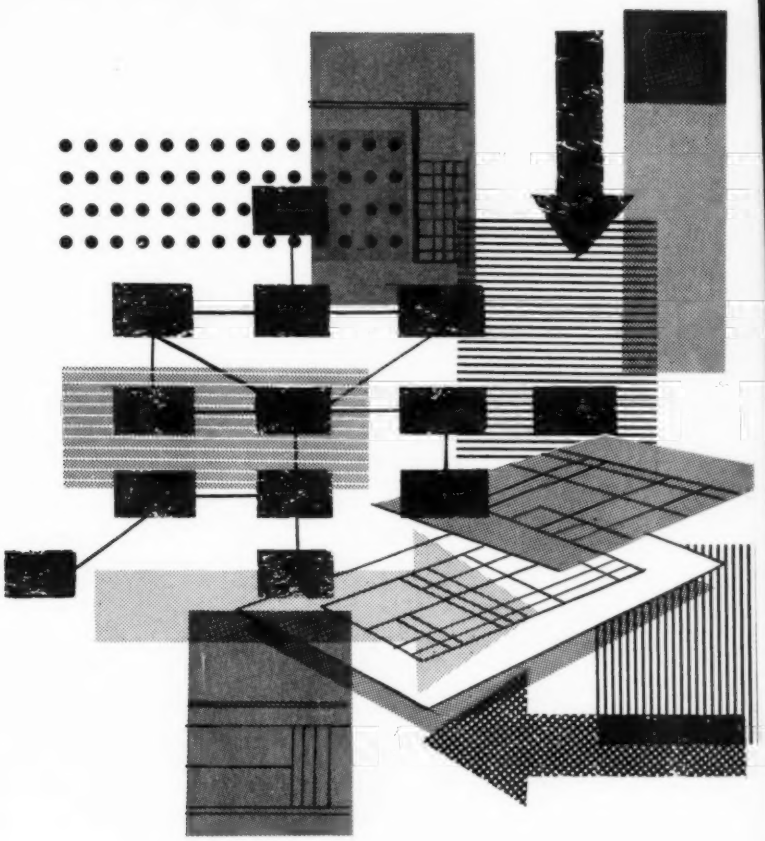

TOOLS OF THE OFFICE

Vital to the efficient functioning of today's office is the right machine for every job—and today there *is* a right machine for every task. Here's a comprehensive review of the major categories of tools and equipment that speed the American office's work.

By MARY D. LYONS, Research Associate

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Adding, Calculating, Bookkeeping and Accounting Machines

The adding machine, like the wheel, has been a consistently fruitful boon to mankind. Beginning with the abacus and on to Charles Babbage's "difference engine" up to present complicated and efficient calculating machines, the historical development of adding and calculating machines has been a long interplay between science, technology, and business.

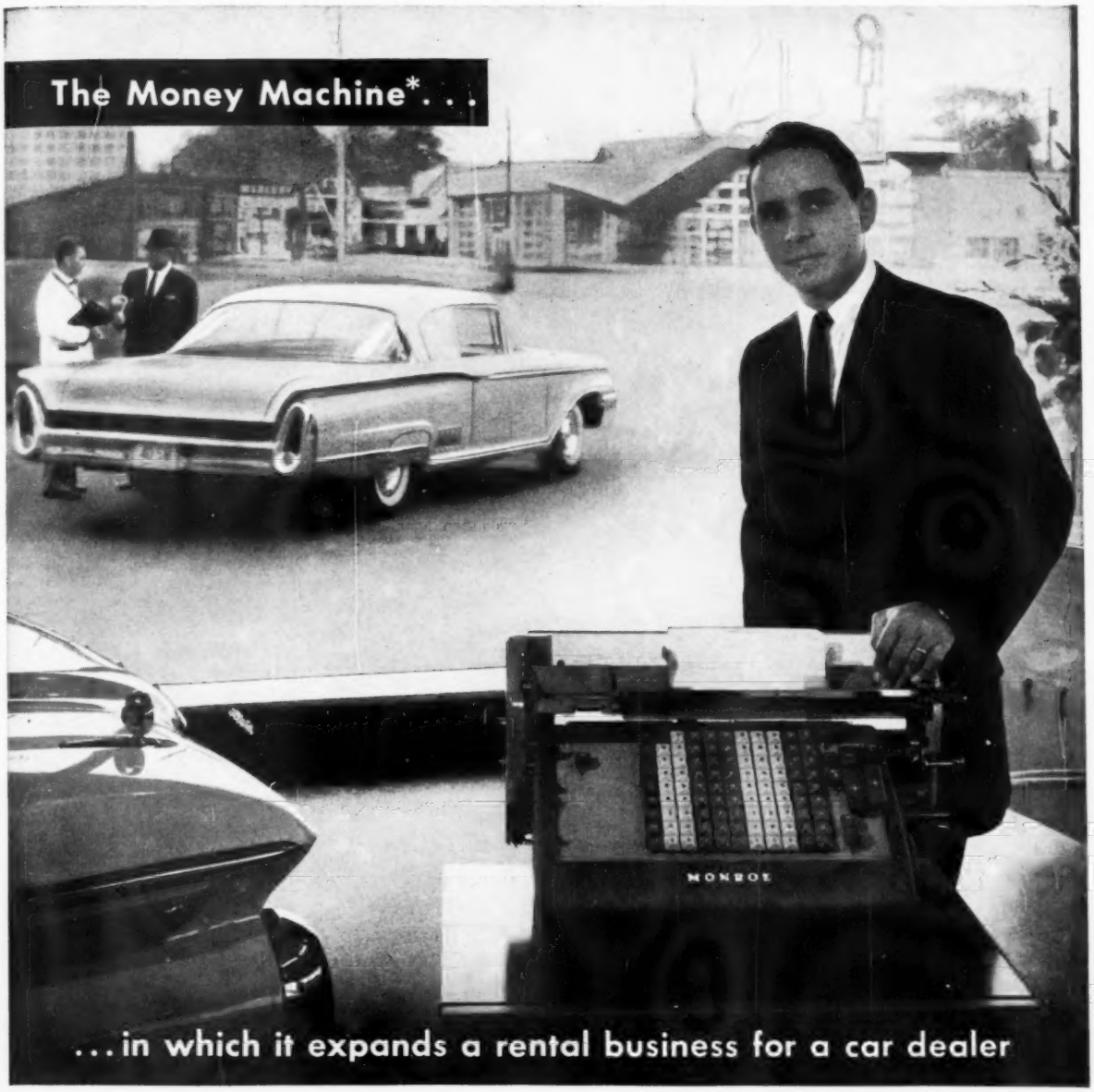
What exactly adding machines and calculators do may seem very mysterious, but such machines actually do nothing more than a man or woman who is good at arithmetic can do, except that they do it much more rapidly, more accurately and without "getting tired." The calculation as a whole seems complicated, but observed closely, it really consists of nothing more than a series of simple basic operations.

In elementary arithmetic, with a pencil and paper, we learn to form the sum, difference, product, or quotient of two numbers of any reasonable size. And machines that perform all four arithmetic operations are now in everyday use.

In order to have a machine perform an arithmetic operation, it is necessary to supply it with two numbers and to instruct it to perform the required operation.

In the simplest machines the operator inserts the numbers by means of a keyboard, and he initiates the desired operation by striking the appropriate operation control key.

When the operation is completed, the result may appear on dials where the operator can read it and copy it onto his computing sheet. In some machines, the result, as well as the



"Our Monroe Accounting Machine saved us $6,724 during its first year. We used that money to enlarge our new leasing subsidiary, Carnegie Auto Rental Company," says Stanley Meisel, President of Meiselgate, car sales and service agency of Cleveland, Ohio. "And our Monroe saved us even more when it took over the extra bookkeeping of the new rental company without extra clerical help."

Meiselgate paid $1,195 for their Monroe Accounting Machine but received a 500% profit through lower accounting costs. This money, invested in expansion, will greatly increase their long-range profits and growth.

Join the hundreds of companies who have cut accounting costs...saved *money to grow on*...with Monroe Machine Accounting. As little as $750 buys it.

***That's what you'll call your Monroe Accounting Machine;** because it *saves money* by lowering your accounting costs...*makes money* by freeing capital for your business to grow on.

FREE CASE HISTORIES

Learn the facts about how Monroe Machine Accounting earned companies more money to grow on. Write:

Accounting Machine Dept. 12
Monroe Calculating Machine Company
Orange, New Jersey

See the MAN from MONROE

A DIVISION OF LITTON INDUSTRIES

for CALCULATING
ADDING • ACCOUNTING
DATA PROCESSING MACHINES

Monroe Calculating Machine Company, Inc., Sales and service in principal cities everywhere. General offices, Orange, N. J.

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individual factors, may be printed automatically on a paper ribbon.

With such machines, the operator need perform no arithmetic operations. His responsibility is to insert the proper factors and to press the required control key for each operation. If the machine has no printing attachment, he must also transcribe the result.

Small, portable machines with keyboard operation are now manufactured on many assembly lines in this country and abroad, and they

The Transflo automatic electric desk calculator by Marchant Calculator, Div. of Smith-Corona Marchant, Inc.

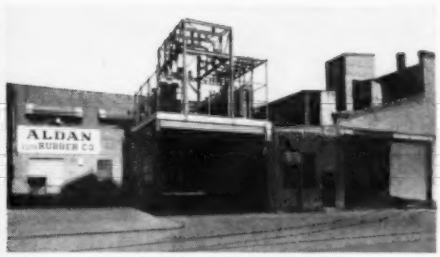
Automatic Printing Calculator by Victor Adding Machine Co.

National Cash Register's Class 33 Accounting Machine.

Addo-x Hours/Minutes Machine for computing elements of time.

Olivetti's Summa 15, 10-key Adding Machine.

ALBERT DANNENBAUM, PRESIDENT of the Aldan Rubber Company.



THE ALDAN RUBBER COMPANY, Philadelphia, Pennsylvania.

A NATIONAL BILL-AND-CHARGE SYSTEM simultaneously handles the invoicing and accounts receivable posting for this fast-growing concern.

"Our *National* Accounting System saves us $10,600 a year... returns 92% annually on investment!"

—**Aldan Rubber Company,** *Philadelphia, Pa.*

"We've already enjoyed six years of efficient office management control through our National System," writes Albert Dannenbaum, President of the Aldan Rubber Company. "We feel it's today's answer to cutting accounting costs.

"Our National '31' provides us with current stock records and virtually eliminates additional work hours during inventory, since accounting is more complete and accurate.

"A National '32' and its Bill-and-Charge System with mechanical computation of each item, furnishes the necessary data for speedy computing of salesmen's commissions. In addition, the versatility of these National Machines enables our staff to process payroll and many other important records.

"We certainly recommend the National System. It saves us $10,600 a year and returns 92% annually on investment."

President, Aldan Rubber Co.

Your business, too, can benefit from the time- and money-saving features of a National System. Nationals pay for themselves quickly through savings, then continue to return a regular yearly profit. National's world-wide service organization will protect this profit. Ask us about the National Maintenance Plan. (See the yellow pages of your phone book.)

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ACCOUNTING MACHINES
ADDING MACHINES • CASH REGISTERS
NCR PAPER (NO CARBON REQUIRED)

THE NATIONAL CASH REGISTER COMPANY, Dayton 9, Ohio

1039 OFFICES IN 121 COUNTRIES • 76 YEARS OF HELPING BUSINESS SAVE MONEY

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are part of the regular equipment of most business offices, and scientific and engineering laboratories.

Those that are limited to addition and subtraction are called adding machines, and those which perform multiplication and division are called desk calculators.

In some of them, the driving power is supplied by the operator, but most of them are equipped with a motor that provides the power when the control buttons are depressed.

The actual arithmetic operations of these are accomplished by means of mechanical devices as distinct from electrical or electronic.

Most of the adding machines have automatic printing devices which print the factors and the results, whereas the results from the calculators appear on dials and are read off by the operator.

Some of the printing-adding machines can be used for multiplication and division, but their speed and capacity in this work are, in general, not equal to the non-printing calculators.

It does not seem likely that high-powered electronic data processing equipment will ever replace old stand-bys such as adding, calculating, bookkeeping, and accounting machines. In fact, standard office equipment of this type will probably always play a crucial role in the day-to-day routines of all offices—especially since, in spite of the efficient systems programmed into various IDP equipment, tasks of exceptional nature continue to exist, and standard office machines are of infinite worth in these circumstances.

And, of course, since most offices don't use any IDP equipment at all, the standard machines discussed are, for them, the *only* "tools."

Therefore, the revolutionary onrush of complex office equipment has not replaced standard machines, except in those instances where the standards were not actually capable of performing their duties at the speeds required.

Instead, the variety of equipment has become so vast, that each office has a better chance than before of acquiring exactly the kind of equipment—whether large, medium-sized, or small—that it needs. In order to determine what its needs actually are, the office must, of course, turn to systems study.

Standard adding, calculating, bookkeeping, and accounting machines, not to be left behind in this age of mechanization, are developing on their own. New features which simplify their operation or increase their capacity are constantly being added.

It is not probable that the mechanical speed of this equipment will be increased by an appreciable degree. However, it is possible to accomplish more and more steps automatically on even the very smallest equipment. Obviously, most figuring, including multiplying and dividing, can be broken down into a form of addition or subtraction. What distinguishes the more complex machines from the smaller ones is the degree to which the necessary intermediate steps in the figuring operation can be accomplished automatically.

Multiplication may be performed on an adding machine by repeated addition. On a calculator, the multiplier may be entered on a separate keyboard, so that the operator has less work to do, and fewer opportunities to err.

Calculators are able to handle a variety of assignments. In fact, calculators may often be quite complex; aside from their regular duties, some are capable of extracting square roots, and can compute in the binary numbering system. Calculators may also feature a memory unit and recall keys, and the automatic positioning of decimal points.

The primary factor which distinguishes bookkeeping and accounting machines from adding machines and calculators is their ability to enter descriptive information. Such information may range from simple codes or date information to complete descriptions.

The Manufacturers

The following two lists cover the principal manufacturer's of figuring equipment. The first list, devoted to makers of adding and calculating machines, is clarified by the use of the following code symbols:

E—Electric machines.

FK—Full-keyboard machines.

FKP—Full-keyboard printing machines.

IDP—Models which read and/or create a "common language," such as punched paper tape, or which otherwise are suitable for use in integrated data processing systems.

M—Manual machines.

MI—Miscellaneous.

TK—Ten-key keyboard machines.

TKP—Ten-key keyboard printing machines.

Addo-X, Inc., 300 Park Ave., New York. (TK-E,M;TKP-E; MI-automatic multiplier)

R. C. Allen Business Machines, Inc., 678 Front Ave., N.W., Grand Rapids 4, Mich. (FK-E,M; TK-E, M; TKP-E,M)

Alma Office Machine Corp., 34 E. 30th St., New York 16. (TKP-E,M)

American Voss Corp., 18050 James Couzens Hgwy., Detroit 35. (TKP-E,M)

Bohn Duplicator Corp., 441 Park Ave. South, New York 16. (TK-M)

Burroughs Corp., 6071 Second Ave., Detroit 32. (FK-E,M;TKP-E,M)

Calculator Equipment Corp., 556 Central Ave., Orange, N. J. (MI-three models of Scotsman calculator)

Clary Corp., 408 Juniper St., San Gabriel, Calif. (FK-E,M;IDP; TKP-E)

Classic Calculators, Inc., 387 Park Ave. South, New York 16. (TKP-E)

Comptometer Corp., 1735 N. Paulina St., Chicago 22. (FK-E,M; TKP-E)

Control Systems, Inc., 5 Beekman St., New York 38. (TK-E,M)

Facit, Inc., 404 Park Ave. South, New York 16. (TK-E,M;TKP-E,M)

Fremaco International, Inc., 188 W. Randolph St., Chicago 1. (TK-M; TKP-M)

Friden, Inc., 2350 Washington Ave., San Leandro, Calif. (FK-E,M; IDP;TKP-E)

The General Gilbert Corp., 150 Broadway, New York 38. (TKP-E)

Johnston Adding Machine Co., 1334

Johnston Adding Machine Co., 13343 Sherman Way, N. Hollywood, Calif. (TK-E;M)

Lanston Monotype, Div. of Lanston Industries, Inc., 24th & Locust Sts., Philadelphia 1. (TK-E,M)

Olivetti Corp. of America, 375 Park Ave., New York 36. (TKP-E)

Olkon Research Corp. of America, P. O. Box 3049, Asheville, N. C. (TKP-E,M)

Regna Cash Registers, Inc., 175 Fifth Ave., New York 10. (FK-E,M; TKP-E,M)

Robert V. Lentz, Treasurer, Southland Supply Company, Inc., Dallas, Texas.

FOR YOUR COMPANY... BIG COMPANY

EFFICIENCY AND CONTROL

"This Moore system cut our payroll preparation time by 40%"

The Southland Supply Co., Inc., wholesale plumbing, air conditioning and industrial suppliers, employs over 80 people. They are paid by check on a weekly basis. Two years ago, company executives took a close look at their payroll system. They found that their records were not completely up to date, that time was wasted in duplicate posting, and that copying errors got into the books in spite of careful balancing and checking.

The system Southland uses now is based on a simple, scientifically designed form, filled out on a standard electric typewriter. The form provides the paycheck itself and clear copies with a single writing. Part 1 is the check, on safety paper with a complete statement of earnings and tax information for the employee. Part 2 is filed numerically in a payroll journal for later reconciliation with the bank statement. The third part is used as a tax record, filed by employee's name in a special binder, shingle-fashion. Totals for each check are visible for easy quarterly recapping. "This system gives us accurate and up-to-the-minute records, with all the information needed for the State and Federal governments," says Mr. Robert V. Lentz, Southland's treasurer. "At the same time, it saves us hundreds of dollars a year, not to mention hours of valuable working time." The system is a Moore Unit Payroll System, with 3-part Speediset forms. It is the company's control in print.

Moore makes forms and complete paperwork systems of all kinds, designed for every use in businesses of all kinds. Whatever your business is, no matter what size, the Moore man can help you get better control through controlled paperwork. Look him up in the Yellow Pages or write the Moore office nearest you.

MOORE BUSINESS FORMS, INC., Niagara Falls, N.Y.; Denton, Texas; Emeryville, Calif. *Over 300 offices and factories throughout the U.S., Canada, Mexico, Cuba, Caribbean and Central America.*

MOORE

Build control with

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Remington Rand, Div. of Sperry Rand Corp., 315 Park Ave. South, New York 10. (TKP-E,M)

Silver Bells Ltd., P. O. Box 982, Carmel, Calif. (FK-M)

Smith-Corona Marchant, Inc., E. Washington St., Syracuse, N. Y. (FK-E,M;TK-E)

Swift Business Machines Co., 51 Church St., Great Barrington, Mass. (TK-M)

Underwood Corp., 1 Park Ave., New York 16. (TKP-E,M)

Victor Adding Machine Co., 3900 N. Rockwell St., Chicago 18. (FK-E,M;TKP-E,M)

Bookkeeping and Accounting Machines

This list covers a wide range of equipment, including standard bookkeeping and accounting machines and systems, charts, tables, and scales useful in accounting and bookkeeping, and, in a few cases, accessory equipment. It does not include integrated data processing equipment (which is covered elsewhere) except for standard punched card systems. The following codes are used:

BA—Bookkeeping and accounting machines of the standard types—i.e., not listed in other categories.

C—Charts, tables, and scales.

E—Small electronic bookkeeping and accounting systems(complete units, no components).

IDP—Standard bookkeeping and accounting machines capable of creating and/or reading a common language record.

MI—Miscellaneous.

OWB—"One writing" systems of the binder type.
OWP—"One writing" systems of the "pegboard" type.

P—Punched card systems.

Addo-X, Inc., 300 Park Ave., New York 22. (BA)

R. C. Allen Business Machines, Inc., 678 Front Ave. N.W., Grand Rapids 4, Mich. (BA)

American Voss Corp., 18097 Sorrento Ave., Detroit 35. (MI-"one writing" systems of machine type)

Ayres Corp., Box 1081, Wilmington, Calif. (MI-Payroll tax computer)

Bates Accounting Forms Co., Inc., 33 W. 42 St., New York 36. (C; OWB;OWP)

The Blackbourn Systems, Inc., 230 S. Cedar Lake Rd., Minneapolis 5. (OWB)

Burroughs Corp., 6071 Second Ave., Detroit 32. (BA;P)

Business Systems Corp., 436 Pearl St., New York 38. (OWB;OWP)

Carteret Printing Co., 480 Canal St., New York 13. (C;OWP;MI-Carbon forms for accounting machines)

Cel-U-Dex Corp., Box 1125, Newburgh, New Windsor, N. Y. (MI-Binders and indexing devices)

Comptometer Corp., 1735 N. Paulina St., Chicago 22. (OWP)

Consolidated Business Systems, Inc., Jersey Ave., New Brunswick, N. J. (MI-Diversified accounting forms)

Cummins-Chicago Corp., 4740 Ravenswood Ave., Chicago 40. (MI-Punched card reconditioners)

Delbridge Calculating Systems, Inc., 2502 Sutton Ave., St. Louis 16. (C)

The Denominator Co., Inc., 261 Broadway, New York 7. (MI-Manual tabulating units)

Diebold, Inc., 2011 Mulberry Rd., Canton 2, Ohio. (OWB)

Ditto, Inc., 6800 McCormick Rd., Chicago 45. (MI-"one writing" systems using spirit duplication)

Evans Specialty Co., Inc., 2401 Venable St. East, Richmond, Va.

Friden, Inc., 2350 Washington Ave., San Leandro, Calif. (C;IDP; MI-Billing machine operated by punched paper tape, tabulating cards or both)

General Binding Corp., 1101 Skokie Hwy., Northbrook, Ill. (OWP)

The Institute of Business Research, Div., of Keller-Crescent Co., 28 E. Riverside Dr., Evansville 8, Ind. (OWB)

International Business Machines Corp., 590 Madison Ave., New York 22. (P)

International Payroll Machine Co., Box 293, Oxford, Pa. (MI-Payroll denominating machines)

Max Isaacs, 1019 McDonald Ave., Brooklyn 30, N. Y. (C)

LeFebure Corp., 716 Oakland Rd. N.E., Cedar Rapids, Iowa. (OWB; OWP)

David Lyons Co., 2100 Greenleaf St., Evanston, Ill. (C)

McMillan Book Co., 701 E. Genesee St., Syracuse, N. Y. (OWB)

Master-Craft Corp., Div. of Shaw-Walker Co., 831-903 Cobb Ave., Kalamazoo, Mich. (OWB;OWP)

Melcar Office & Business Equipment, 480 Canal St., New York 13. (C)

Monroe Calculating Machine Co., Inc., 555 Mitchell St., Orange, N. J. (BA;C)

The National Blank Book Co., P. O. Box 791, Holyoke, Mass. (OWB)

The National Cash Register Co., Main & K Sts., Dayton 9, Ohio. (BA;E;IDP;MI-"one writing" paper systems)

Norfield Methods & Procedures, Inc., 933 S. Clinton Ave., Oak Park, Ill. (OWP)

Olivetti Corp. of America, 375 Park Ave., New York 3. (BA)

Payroll Tax Service, Inc., 44 W. 29 St., New York 1. (C;OWP)

W. H. Pusch, 427 W. Lynwood, San Antonio, Texas. (C)

Recordak Corp., 415 Madison Ave., New York 17. (MI-Photographic accounting systems)

Remington-Rand, Div. of Sperry Rand Corp., 315 Park Ave. South, New York 10. (BA;IDP;P)

The Reynolds & Reynolds Co., 800 Germantown Ave., Dayton 7, Ohio. (OWP)

Royal McBee Corp., Data Processing Div., Westchester Ave., Port Chester, N. Y. (E;OWP;P)

S. K. Forms Co., 1907 Chestnut St., Philadelphia 3. (C;OWB)

Safeguard Corp., Lansdale, Pa. (OWP)

The Shaw-Walker Co., Muskegon, Mich. (OWB;OWP)

The C. E. Sheppard Co., 4401 21 St., Long Island City 1, N. Y. (OWB; OWP)

Silver Bells, Ltd., P. O. Box 982, Carmel, Calif. (C)

Specialty Papers Co., 2028 Farrington St., Dallas. (C)

Speedograph, Inc., 5440 S. Ashland Ave., Chicago 9. (OWP)

Tab Products Co., 995 Market St., San Francisco 3. (P)

The Todd Co., Inc., Div. of Burroughs Corp., 6071 Second Ave., Detroit 32. (OWB;OWP)

UARCO, Inc., 300 W. Congress Pwy., Chicago. (MI-Autographic registers)

Underwood Corp., 1 Park Ave., New York 16. (BA;IDP)

Victor Adding Machine Co., 3900 N. Rockwell St., Chicago 18. (BA; P)

VISIrecord, Inc., Copiague, L. I., N. Y. (OWP)

Wilson Jones Co., 209 S. Jefferson St., Chicago 6. (OWB;OWP)

Another example of Addressograph-Multigraph cost-cutting

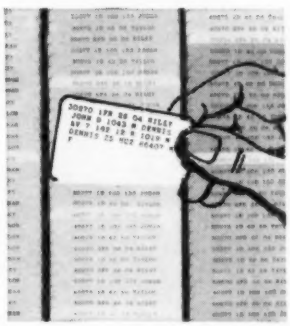
Telephone company solves trouble fast with new Addressograph system

When your telephone goes out of order—and you're suddenly cut off from the outside world—you want it fixed fast. Here is how a new Addressograph system helps telephone companies do it:

For every telephone installed, an Addressograph self-writing plastic subscriber card—embossed with complete information about your installation—is placed on file.

The moment you report trouble, a repair order is made out from the card, using an Addressograph imprinter, and the stage is set for action—almost as soon as you hang up the phone.

For every business, Addressograph methods provide cost-cutting, error-free repetitive writing. Some Addressograph machines are designed to offer business the many benefits of complete, low-cost automation. Others are small portable units for use wherever a record originates—thus assuring accurate, legible source information for any method of data processing. Ask the nearby Addressograph office for a report on how they can cut your costs, or write Addressograph-Multigraph Corporation, Cleveland 17, Ohio.



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Addressograph-Multigraph

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Mailroom Equipment: *Addressing equipment; collators; folding and inserting machines; opening and sealing machines; postal scales; etc*

Human population is not the only thing exploding in the world today. Just as timely—and every bit as urgent—is the problem of "the exploding business correspondence." American firms are dispatching 12,000,000,000 pieces of mail yearly (enough, stacked up, to reach 4,500 miles into outerspace; enough, lined up, to circle the globe 60 times)!

In light of this, it is almost frightening to imagine what would happen to business, commerce, and industry without mailroom equipment.

Addressing equipment

Addressing equipment, a very common type of mailing apparatus, usually "prints" addresses from embossed metal plates, stencils, or spirit masters. The masters for the last two types may be prepared in individual form or in strips or rolls.

Many systems employ a form of coding so that classes of addressees may be withdrawn from master files for selective mailings. Some machines are capable of selecting addressees automatically; however, in other types, the codes merely make possible the identification of individual addressees in a particular category or group by the operator as he or she comes to them. Units such as these, of course, can only be used with addressees contacted regularly enough to warrant the preparation of an address plate or stencil. A great number of mailing pieces must still be individually addressed.

More complex processes in use today include an adaptation of the photo-electric reproduction method known as facsimile, and of an "electrostatic" method in which an optical system projects an address onto a label in such a manner as to create an electrical charge; the charged characters and numerals attract oppositely charged ink in the form of a spray. The latter method, not dissimilar to the xerographic copying process, is potentially capable of operating at speeds of thousands of lines a minute.

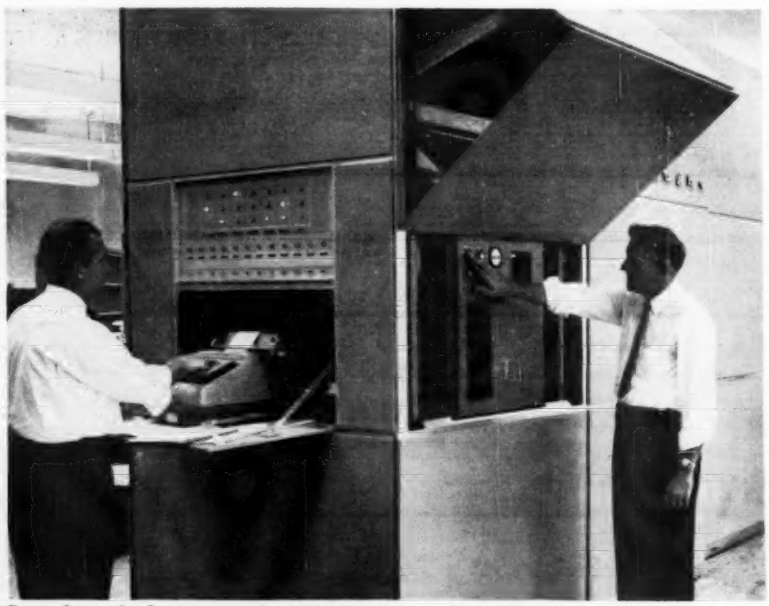
Many addressing tools are merely simple manual devices such as hand stamps used for addressing cartons and packages, or hand-held addressing devices which contain spirit master rolls holding a list of names and addresses. The variety of addressing equipment is, of course, considerable, and it ranges from highly complex types of machinery to simple hand devices.

Collators

Collators, like addressing equipment, are often situated outside the mailroom; and they too play an important role in the mailing process.

The simplest type of collating device is usually a rack in which stacks of pages may be placed in sequence so that they may be gathered and arranged into individual sets. More advanced models involve the use of bins. The pages are collated from the bins (one page from each bin) to make complete sets. In cases where a feeding mechanism is provided from each bin, a simple form of mechanical collation can exist. This is achieved through a type of arm which moves in and out of each bin taking the top sheet from the stack so that it may be placed in proper sequence with sheets from the other bins. The series of arms so used are operated mechanically so that they are coordinated, and may be controlled easily by the operator. This type of collator may use foot control, manual power, or operate electrically.

Other collators employ stacks arranged in such a way that as the top sheets are removed, they are gathered mechanically, as by riding on a moving belt. This method allows many types of arrangements. For instance, in some cases, the stacks are placed vertically while others are set in a horizontal sequence. Some collators carry the



Control panel of a new semi-automatic letter sorting machine made by the Burroughs Corp., under contract by the Post Office.

NEW...

MODEL 10 SCRIPTOMATIC ADDRESSING MACHINE

NOW *EVERYONE* CAN CUT ADDRESSING COSTS *SUBSTANTIALLY!*

Scriptomatic advantages are now within reach of small list users with the new Model 10 Scriptomatic Addressing Machine.

HERE IS A TYPICAL COMPARISON OF FIGURES:

Of course, every installation has its specific requirements. These figures are reported only to guide you on relative costs.

Cost of Nearest Competing Equipment versus Scriptomatic Model 10

MACHINE X	$1,355.	NEW MODEL 10	$1,790.
Feeder	709.	Feeder	400.
Embossing Unit	1,560.	Master Card Writer	675.
21,000 Plates, embossed and assembled	1,050.	21,000 Master Cards typed including carbon, etc.	362.
Total Cost	**$4,674.**	**Total Cost**	**$3,227.**

SCRIPTOMATIC ALSO GIVES YOU THE ADVANTAGE OF COMBINING AN ADDRESS MASTER WITH A PUNCHED CARD. YOU GET LOW COST STRAIGHT RUN ADDRESSING OR HIGHLY SELECTIVE ADDRESSING, AS DESIRED.

The Model 10 is a compact, desk-mounted unit that is practically foolproof to operate. Insertion of material activates all operations: master feeding, ejection, counting and stacking. No hand levers or foot pedals. You can switch from hand feed to automatic feed, and vice versa, in less than a minute. No tools, clamps or bolts. No belt conveying mechanism. Scriptomatic prints from low-cost typewritten masters or punched cards. Prints on standard material of practically any type or size—booklets, broadsides, etc. The Model 10 is ideal for small runs and alternate hand feed or automatic feed operations.

Now *every* list user can mechanize for faster, more economical addressing and data writing by the modern Scriptomatic method. Write for free bulletin, "Advanced Approach to Addressing and Data Writing."

801

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NO OTHER PAPER CUTTER BUILT SO WELL TO SELL SO LOW

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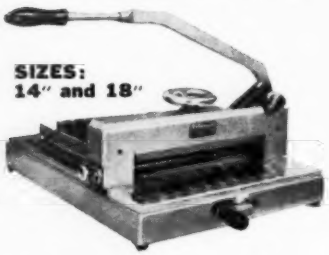
the precision Paper Cutter



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For every business: Banks, hospitals, insurance companies, industrial organizations with duplicating departments, stationers, photo finishers, small printers, lettershops, mimeograph, offset shops, advertising agencies, schools and colleges.

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145 West 45th Street, New York 36, N.Y.

Use EAC Quality Cards

for Efficient, Economical Processing

Write . . . wire . . . or phone for fast delivery of stock cards. Our inventory is maintained to assure shipment same day order is received. EAC guaranteed quality and service eliminates down time in your data processing operation.

ELECTRONIC ACCOUNTING CARD CORP.

Electronic Accounting Card Corporation
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Please send me price list and samples

Name_____

Address_____

stacks in pockets which are mounted to rotate either vertically or horizontally. Collating machines may use friction feeds, suction types, or vacuum feeds. The more expensive machines offer a variety of safety devices to prevent misfeeding. Some measure the thickness of pages gathered from each stack, and should double loading occur, the machine stops and a warning signal is given. Others are equipped with photoelectric cells scanning each station in order to stop the machine should a blank page appear in a stack. A large variety of accessories is offered with the more complex machines; among these are counting, folding, stitching, stapling, and offset stacking facilities.

Folding machines, which may be either manually or electrically operated, can make a variety of standard folds. The desired fold is determined by making a simple adjustment on the machine.

Inserting machines gather materials and insert them into envelopes. The simplest machines insert only one item, but larger machines may gather enclosures from a number of stations, inserting complete sets. More advanced equipment in this category may fold the material, gather it, and insert it; postage metering facilities are also sometimes included, as well as sealing and stacking features. These machines can carry out the complete mailing operation once the original material has been prepared and addressed.

Opening and sealing devices

The most important task of the envelope opening machine consists of trimming a small edge off one side of the envelope. These machines may be operated either manually or electrically: the electric units, which have become increasingly popular, are able to open an enormous amount of envelopes in a very short time. Usually, the amount of material trimmed off can be regulated by a simple adjustment to the machine. In order to avoid cutting into material contained inside the envelopes, a jogging device can be used to shake all material to the bottom of the envelopes.

Sealing equipment is usually relatively uncomplicated as it merely moistens the envelope flap and then moves the envelope between rollers to press it closed. Some sealing machines can also apply postage stamps. More elaborate machines are electrically operated, and sealing features are often combined with postage printing and other mailing facilities.

Postage metering equipment prints postage directly onto envelopes or onto postage labels or strips which are to be affixed to mailing pieces. Since the postage so printed is equivalent in amount to U.S. Government stamps of the same value, its use is controlled by strict government regulation.

Postal scales

The most economical of these machines for a small office are those which are operated manually. Larger models may be equipped with automatic loading features; and postage metering facilities may be included in machines which fold, gather, seal, insert, and stack mail all in one operation.

Stamp affixing machines are usually small and designed to apply ordinary postage stamps directly to mailing pieces. In companies that have no postage metering machines this equipment is extremely helpful. Accessory facilities for affixing stamps are often found in large

new PORTABLE MAILBAG HOLDER
Speeds Handling - Lowers Costs

EASY TO
LOAD — MOVE — UNLOAD

Write for details:
W. A. CHARNSTROM CO.
422 So. 7th St. Minneapolis 15, Minn.

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labeling machines and other mailing equipment.

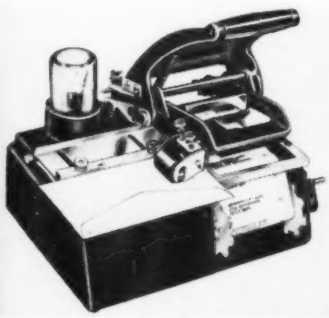
Postal scales differ from each other greatly in both size and quality. Models range from small letter scales to those designed to weigh parcel post packages. If scales do not have good quality workmanship, they may be inaccurate which will create a problem whichever way the error occurs: A reading which is too high results in unnecessary postage expenditure. A reading which is too low will result in a postage-due letter—a circumstance which may produce bad public relations as well as cause a good deal of annoyance on the part of the recipient.

Scales vary also in their weighing methods. Some use springs, while gravity scales use a system of balances. Indicators vary in arrangement, information, and legibility. One feature designed to guard against misreading the scale is the so-called "gunsight" indicator, in which only the pertinent portion of the indicator scale is exposed to view at one time.

Mailroom furniture and miscellaneous equipment include any furniture and equipment which enables the mailroom staff to carry out its duties.

Furniture items usually consist of sorting bins, racks, tables, stands, and cabinets. Miscellaneous items that could conceivably be used in the mailroom are impossible to list in their entirety but things such as mailbags and mailbag holders, tape dispensers, mail carts, labeling machines, and counting machines are among the most common of these accessory units.

A common type of mail sorting device is a large case or table



Master Addresser's Model 70 addressing machine is a mechanical system using the Hecto-carbon process (no ink, stencil).

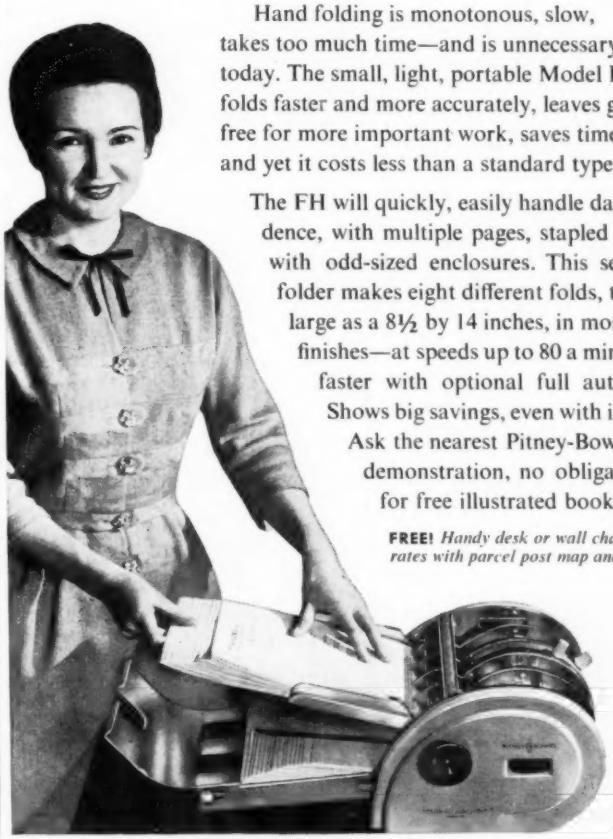
One FH saves time for several departments!

"We got a Pitney-Bowes folder in the Advertising Department to fold form letters. Then Billing began to borrow it, for invoices. Now Sales folds price lists, and Engineering spec. sheets. That little PB folder is saving a lot of time and headaches in several departments."

Hand folding is monotonous, slow, takes too much time—and is unnecessary today. The small, light, portable Model FH folds faster and more accurately, leaves girls free for more important work, saves time—and yet it costs less than a standard typewriter!

The FH will quickly, easily handle daily correspondence, with multiple pages, stapled or loose, and with odd-sized enclosures. This semi-automatic folder makes eight different folds, takes sheets as large as a 8½ by 14 inches, in most weights and finishes—at speeds up to 80 a minute. (It's even faster with optional full automatic feed). Shows big savings, even with infrequent use. Ask the nearest Pitney-Bowes office for a demonstration, no obligation. Or send for free illustrated booklet.

FREE! *Handy desk or wall chart of new postal rates with parcel post map and zone finder.*



The folder that costs less than a standard typewriter!

The larger model FM, fully automatic, can fold up to 19,000 sheets an hour.

PITNEY-BOWES
Folding & Inserting Machines

Made by the originator of the postage meter . . . offices in 122 cities.

NEW! *PB's 3300-FH combined folder-inserter folds and stuffs 500 bills, letters, etc. in envelopes in 8 minutes! By itself, the 3300 hooks onto any PB folder, or can serve as an inserter alone.*

PITNEY-BOWES, INC.
2913 Walnut St., Stamford, Conn.
Send free ☐ booklet on PB folding and inserting machines; ☐ Postal Rate Chart
Name _____
Address _____

equipped with bins or racks for different classes of addressees. The equipment is often large and may be custom built.

There also exist very simple sorting devices called desk-top racks consisting of flat boards with hinged dividers for handling small volumes of material. This type of equipment is often originally designed for use in accounting departments rather than the mailroom, and much of it is made in sizes for checks and other material, not of letter size. However, since some of it has mailroom applications, it is listed here in cases where manufacturers state that their sorters are so used.

New developments in mailroom equipment include a new letter sorter by Burroughs, which is described as the world's largest capacity letter sorting machine. It is capable of sorting 43,000 letters an hour to 279 destinations. The machine is 78 feet long and 10 feet high. With machine sorting letters move automatically in front of a human operator seated at a keyboard. As each letter passes, the operator presses several keys. This sets wheels in motion inside the machine to route the letter to any one of 279 destination slots. The machine is said to be readily adaptable for use in post offices of varying sizes.

New collators have recently been introduced by J. Curry Mendes Corporation, Thomas Collators' and the Macey Company.

The Manufacturers

The list below is devoted to manufacturers of the principal types of mailing equipment, plus some equipment which, while not always used in the mailing room, may properly be grouped there. Because of space restrictions, the list is limited to basic categories of equipment, which are indicated by the following codes:

A—Addressing equipment.
C—Collators.
E—Electric machines.
EOS—Envelope opening and sealing machines.
F—Furniture other than sorting racks and bins.
FI—Folding and/or inserting equipment.
M—Manual machines.
MI—Miscellaneous.
PM—Postage metering machines.
PS—Postal scales.
SA—Postage stamp affixing machines.
SD—Sorting bins and devices of use in the mailroom.

Addressograph-Multigraph Corp., 1200 Babbitt Rd., Cleveland 17. (C-E;A-E,M)
Amberg File & Index Co., 1627 E. Duane Blvd., Kankakee, Ill. (SD)
Associated Industrial Designers, P. O. Box 39652, Los Angeles. (SD)
B-T Co., Inc., 121 N. Broadway, Milwaukee 2. (PS)
Bell & Howell Phillipsburg Co., 11 W. 42nd St., New York. (FI-E; PM-E)
Better Packages, Inc., 252 Canal St., Shelton, Conn. (EOS-E,M; MI-Tape dispensers and labelors)
The Bircher Co., Inc., 192 Mill St., Rochester 4, N. Y. (EOS-E,M)
Bohn Duplicator Corp., 444 Park Ave. S., New York. (EOS-M)

SPEED
YOUR TYING

TIE LETTERS, PARCEL POST, CHECKS, BOXES, CIRCULARS, LABELS, PRINTED MATTER AND THOUSANDS OF OTHER ITEMS 10 TIMES FASTER *with an*

AUTOMATIC PAK TYER

Low in cost. This **ALL-PURPOSE** Tying Machine will tie any size or shape package tight. No adjustments needed. Easy to operate and maintain. Ties cotton twines, tapes, and braids. Several models to choose from.

LET FELINS CUT YOUR MAILING COSTS. WRITE FOR CIRCULARS AND PRICES NOW.

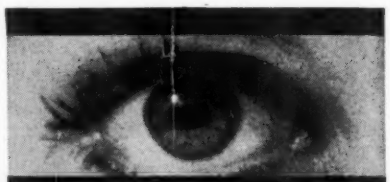
FELINS TYING MACHINE CO.
3351 N. 35th St.
Milwaukee 16, Wis.

Mail Cart! MODEL LS-2

Put efficiency in your mail operation! This double-deck polished aluminum mail cart by Chesley lets your mail department categorize incoming mail for quick, error-free delivery. Lower basket for out-going mail. Both baskets are removable.

BASKET SIZE—(Upper) 17½x25x11; (Lower) 17½x25x8 FRAME—High Polished Aluminum • BASKETS REMOVABLE SHIPPING WEIGHT—33 lbs. • PRICE—$47.50 • TERMS 1% 10 days, net 30 days • F.O.B. Detroit.
File folders to fit guide bars — $.24 ea.
Write for free brochure — or, better still — order today!

Chesley Industries, Inc.
24777 Telegraph Road, Detroit 41, Mich.



Now! The Only Sure Way To Keep Confidential Papers

ABSOLUTELY SECRET

Lowest Price Machine on Market!

No surer, faster or safer way to keep confidential papers secret than by positively destroying them. Do it right in your own office with the new Shredmaster Bantam 10. Anyone can use it. Handsome and modern in design, clean and quiet in operation. Now at a new low price. (Other models of greater capacity available.)

FREE: Illustrated, descriptive folder giving details of free trial. Just write today to Dept. E-1.

THE SHREDMASTER CORPORATION
384 Woodcleft Ave.
Freeport, N. Y.

Use Readers' Inquiry Coupon on Page 184

The Borg-Erickson Corp., 1133 N. Kilbourn Ave., Chicago 5. (PS)

Can-Pro Corp., 19-23 E. McWilliams St., Fond du Lac. Wis. (MI-Mail bags and distributing cases)

Cel-U-Dex Corp., P. O. Box 1127, New Windsor, Newburgh, N. Y. MI-Label holders;SD)

W.A. Charnstrom Co., 422 S. 7th St., Minneapolis 15. (MI-Mail bag holders)

Cheshire, Inc., 1644 N. Honore St., Chicago 22. (MI-Labeling equipment; SA)

Chesley Industries, Inc., 24777 Telegraph Rd., Detroit 41. (MI-Mail carts)

The Collamatic Corp., Wayne, N, J. (C-E)

Corbin Wood Products Div., The American Hardware Corp., P. O. Box 1324, New Britain, Conn. (F;SD)

Cummington Corp., 277 Huntington Ave., Boston 15. (C-E;FI-E;PS)

Cummins-Chicago Corp., 4740 N. Ravenswood Ave., Chicago 40. (MI-Mail marking equipment)

Currier Mfg. Co., 2448 W. Larpenteur, St. Paul 13. (SD)

Davidson Corp., 29 Ryerson St., Brooklyn 5, N. Y. (FI-E)

Dependable Mfg. Co., 2407 Ft. Crook Rd., Bellevue, Neb. (F-Stools)

Derby Sealers, Inc., 100 Seymour Ave., Derby, Conn. (MI-Tape dispensers;EOS-E)

Detecto Scales, Inc., 540 Park Ave., Brooklyn 5, N. Y. (PM;PS)

A. B. Dick Co., 5700 W. Touhy Ave., Chicago 31. (FI-E)

The Dick Patent Mailer Co., 137 W. Tupper St., Buffalo 1, N. Y. (MI-Labeling machines)

Didde-Glaser, Inc., Hwy. 50 & W. Twelfth St., Emporia, Kans. (C-E)

Elliott Addressing Machine Co., Cambridge, Mass. (A-E,M)

Equipto Div., Aurora Equipment Co., 422 Cleveland Aurora, Ill. (F-SD)

Evans Specialty Co., Inc., 2401 Venable St. East, Richmond, Va. (C-M;MI-Moistener aid in sorting and counting)

The Federal Equipment Co., P. O. Box 446, Carlistle, Pa. (F;MI-Mail bags and racks;SD)

Friden, Inc., 2350 Washington Ave., San Leandro, Calif. (EOS-E,M; E;MI-Mail bags, tables, mail bag holders, distributors;PS;SA;SD)

This 16-station electric collator from Thomas Collators has a capacity of 1½-inches of paper per bin.

The General Fireproofing Co., 413 Dennick Ave., Youngstown, Ohio. (SD)

General Photo Products Co., Inc., 15 Summit Ave., Chatham, N. J. (C-M-For photocopying work)

Glue-Fast Equipment Co., Inc., 11 White St., New York. .MI-Tape dispensers, labeling machines; EOS-M)

Hamilton Specialties, Inc., 148 Old Colony Ave., Wollaston 70, Mass.

"2 HEADS are better than 1"

Quick Changeover of Labeling Heads Multiplies the Money-Saving Benefits of this

CHESHIRE Labeling Machine

NOW you can label ALL of your jobs with MODEL E's high speed and automatic accuracy. No wasted labels, no skipped pieces, regardless of label type used. Instant changeover to proper head lets you apply the desired type of label to practically any class of printed material.

INTERCHANGEABLE HEADS
New R-4700
ROTARY HEAD APPLIES CUT OR INDIVIDUAL LABELS (gummed or ungummed) ⅞" x 2½" to 3½" x 5" . . . up to 14,000 per hr.
R-4600
UNIVERSAL ROTARY HEAD applies both wide roll strip and narrow tape strip labels.

MODEL E

If CUT labels ONLY are to be applied, Model E can be supplied with the R-4700 Rotary Head in lieu of the Roll or Tape Strip Head.

Fully automatic label application. Feeds, cuts, glues and attaches pre-addressed labels—re-loads labels and glue without stopping machine.

Labeling Heads also available as separate units for various machines not manufactured by Cheshire.

INVESTIGATE NOW ...NO OBLIGATION

CHESHIRE, INC.
1644 NORTH HONORE STREET • CHICAGO 22, ILLINOIS

Use Readers' Inquiry Coupon on Page 184

Hanson Scale Co., 1777 Shermer Rd., Northbrook, Ill. (PS)

Hartman Metal Fabricators, Inc., 133 Murray St., Rochester 6, N. Y. (SD)

Haskell, Inc., 303 E. Carson St., Pittsburg 19, Pa. (F)

The Heyer Corp., 1850 S. Kostner Ave., Chicago 23. (A-M)

S. A. Hirsh Mfg. Co., 8051 Central Park Ave., Skokie, Ill. (MI-Shelving)

I.D.L. Mfg. & Sales Corp., 281 E. 137th St., New York 54. (PS)

Ideal Stencil Machine Co., 102 Iowa Ave., Belleville, Ind. (MI-Tape dispensers)

Industrial Molded Products Co., Inc., 609 New York Bldg., St. Paul 1, Minn. (EOS)

Interior Steel Equipment Co., 2352 E. 69th St., Cleveland 4. (F;SD)

Jayem Sales Corp., 31 Coffey St., Brooklyn 31, N. Y. (SD)

Ketcham & McDougall, Inc., 465 Eagle Rock Ave., Roseland, N. J. (MI-Tape dispensers)

Kohlhass Co., 8012 S. Chicago Ave., Chicago 17. (SD)

Lansdale Products Corp., Box 568, Lansdale, Pa. (EOS-E;FI-E;MI-Cutter and perforator to make up odd-size cartons from flat stock.

Lee Products Co., 2736 Lyndale Ave. S., Minneapolis 8, Minn. (MI-Fingertip application which aids sorting)

LeFebure Corp., 716 Oakland Rd. N.E., Cedar Rapids, Iowa. (SD)

W. C. Leute, 54 Dey St., New York 7. (MI-Mail bags)

Macey Co., 1385 Enterprise Ave., Cleveland 35. (C;FI)

Dick Mailer Co., 137 W. Tupper St., Buffalo 35. (MI-Labeling machine which applies addressed labels to various mailing pieces)

Mail-O-Matic Corp., Beverly-Hilton Hotel, Beverly Hills, Calif. (FI;M)

Marsh Stencil Machine Co., 82-C Marsh Bldg., Belleville, Ill. (MI-Gummed tape dispensers)

Martin-Yale, Inc., 2100 W. Fulton St., Chicago 12. (EOS;FI)

J. Curry Mendes Corp., 41 Merrimac St., New Bedford, Mass. (C-E;FI-E)

Metal Specialties Mfg. Co., 3547 Mass. Ave., Indianapolis, Ind. (MI-Tape dispensers)

The Multistamp Co., 527-29 W. 21st St., Norfolk 10, Va. (A-M)

Nashua Corp., 44 Franklin St., Nashua, N. H. (MI-Gummed tape dispensers)

Nettle Mfg. Co., 27 Huntington Ave., Boston 16, Mass. (A-M)

Nu-Craft Products Co., 321-327 Clarkson Ave., Brooklyn 26, N. Y. (SD)

Office Accessories Corp., 660 S. Fair Oaks Ave., Pasadena 2, Calif. (EOS-M;MI-Tape dispensers;SA)

Office Dynamics Corp., The Beverly-Hilton, 9876 Wilshire Blvd., Beverly Hills, Calif. (EOS-E;FI-E;PS;SD)

Pelouze Mfg. Co., 1218 Chicago Ave., Evanston, Ill. (PS)

Pitney-Bowes, Inc., Walnut & Pacific Sts., Stamford, Conn. (C-E;EOS-E,M;F;FI-E)

Pres-to-Line Corp. of America, 2339 Cotner Ave., Los Angeles 64. (EOS)

The Print-O-Matic Co., Inc., 724 W. Washington Blvd., Chicago 6. (EOS-E;FI-E)

The Recordplate Co., 130 N. Fair Oaks Ave., Pasadena 1, Calif. (SD)

Remington Rand Div. of Sperry Rand Corp., 315 Park Ave. S., New York 10. (C-M)

Rex-Rotary Distributing Corp., 387 Park Ave. S., New York 16. (FI-E,M;A-P,M)

new 50-station collator

Fully automatic . . . unprecedented performance without the penalty of high price or space waste!

Announcing a new dimension in collating versatility, accuracy, speed and compactness — the all-new, completely automatic Rotomatic by Thomas Collator Industries, Inc. If you collate in volume, you'll want all the details on the Rotomatic's ease of total operation and multiple savings. For complete information and prices, without obligation, write today.

- Accurately collates, counts, staggers or stitches 25,000 sheets per hour
- Exclusive push button programmer permits different jobs to be run at same time
- Occupies only 17½ sq. ft. of floor space
- Loads in less than 7 minutes . . . no adjustments for vacuum systems, fans, weights, finishes
- Handles sheet sizes from 7" x 8" to 11" x 14" in most every weight and finish
- Offers more features at a lower price than any other collator on the market

Thomas Collator Industries, Inc.

Dept. E4, 100 Church Street, New York, New York

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Royal McBee, Westchester Ave., Port Chester, N. Y. (MI-Portable spirit type duplicator which reproduces fixed information such as addresses on envelopes)

S&M Distributing Co., 3875 Garland St., Wheat Ridge, Col. (A-M)

Seal-O-Matic Dispenser Corp., 169 Murray St., Newark, N. J. (EOS-M;MI-Tape dispensers)

The Sorter-Graf Co., 4044 W. Jefferson Ave., Detroit 9. (SD)

Speed-O-Print Corp., 1801 W. Larchmont Ave., Chicago 13. (EOS-E)

Standard Duplicating Machines Corp., 1935 Parkway, Everett 49, Mass. (EOS-E,M)

Standard Pressed Steel Co., Columbia-Hallowell Div., Box 919, Jenkintown, Pa. (SD)

Stromberg Time Corp., Subsidiary of General Time Corp., Thomaston, Conn. (MI-Stamps used to print date and time of arrival on correspondence and other papers)

William W. Stanley Co., Inc., 401 Broadway, New York 13. (MI-Mail bags)

Syntron Co., 715 Lexington Ave., Homer City, Pa. (MI-Joggers)

Swingline, Inc., 32-00 Skillman Ave., Long Island City 1, N. Y. (MI-Remote control electric stapler)

Tape, Inc., 708 S. Broadway, Green Bay, Wis. (MI-Taped dispensers)

Thomas Collators, Inc., 100 Church St., New York 7. (C-E,M)

The Toledo Metal Furniture Co., 1100-1200 Hastings St., Toledo 1, Ohio. (F;MI-Mail trucks;PS)

Toledo Scale & Mfg. Co., 1083 Telegraph Rd., Toledo 1, Ohio. (PS)

Triner Scale & Mfg. Co., 2714 W. 21st St., Chicago 8. (PS)

The Victor Safe & Equipment Co., Inc., 315 Park Ave. S., New York 10. (SD)

The Wadsworth Mfg. Co., P. O. Box 125, Wadsworth, Ohio. (C-E,M)

Weber Marking Systems, Inc., Weber Industrial Park, Mount Prospect, Ill. (MI-Label printing machines)

Wilson-Jones Co., 209 S. Jefferson St., Chicago 6. (EOS-M)

Chauncey Wing's Sons, 78 Pierce St., Greenfield, Mass. (MI-Label affixing machines;A-M)

Yawman & Erbe Mfg. Co., Inc., 1045 Jay St., Rochester 3, N. Y. (F;SD)

Zephyr American Corp., 95 Morton St., New York 14. (EOS-M)

Air Conditioning Equipment; Fans and Air Circulators

Before the age of air conditioning, most offices during the summer months, were filled with surly perspiring faces. Senior executives and junior executives, sweltering in their gray flannel-suits, spoke crossly to secretaries. And secretaries snarled at typewriters as their fingers stuck to the keys. All in all, it was most unpleasant.

Luckily, today, most large offices have air conditioning. In fact, an OFFICE MANAGEMENT reader survey last year indicated that more than sixty-five per cent of the respondents had air-conditioned offices, and that an additional twenty per cent were planning to install air conditioning within the near future.

Management is fully aware that well air-conditioned offices do much to boost employee morale, increase efficiency, and help to attract desirable personnel to the company. Air conditioning manufacturers have reported that the average

A Small Investment that

Pays Big Dividends in Operator Efficiency

Old-fashioned rubber fingers or messy sponges handicap finger dexterity where it counts the most—operating your automated office machines.

With SORTKWIK Operator picks up papers as fast as dexterity permits. Just a touch on fingertips creates a greaseless, stainless, tacky film . . . makes it easy to pick up papers of all kinds. Even new currency, smooth-finish papers, index cards, NCR paper are a cinch to handle with SORTKWIK.

Wherever paper handling is a problem, you'll find that SORTKWIK helps do the job faster, more conveniently. Thousands of businesses have been using this handy fingertip preparation for years as a staple office supply item.

Why not try it in your office and find out how clerical production goes up while clerical costs go down?

SORTKWIK®

the modern aid to
HANDLE PAPERS FASTER

Speeds handling and sorting of papers, cards and currency.
SORTKWIK
Replaces unsanitary sponges and rubber fingers. Safe. Not Harmful to Skin. Water OR Resist.
Apply to Thumb and Forefinger of Each Hand. Rub in Until Dry.
LEE PRODUCTS CO.
2736 Lyndale So., Mpls. 8, Minn.
Slide

ONLY 50c EACH
AT YOUR STATIONERS
or mail coupon direct to

LEE PRODUCTS COMPANY
Dept. OM-1, 2736 Lyndale Ave. So.
Minneapolis 8, Minn.

LEE PRODUCTS COMPANY
Dept. OM-1, 2736 Lyndale Ave. So. • Minneapolis 8, Minn.
☐ Please send me 2 regular size containers for $1.00 postpaid.

Name_____

Company_____

Street_____

City_____ State_____

worker in a non-air-conditioned office loses one hour of productivity per day during extremely hot weather. However, on the other hand, some firms have complained that the average worker in an air-conditioned office loses one day of productivity per week during extremely hot weather because of a summer cold.

There are, essentially, four major items upon which office comfort is dependent: (1) Temperature. (2) Relative humidity. (3) Air movement. (4) The dress and physical activity of those within the air-conditioned space.

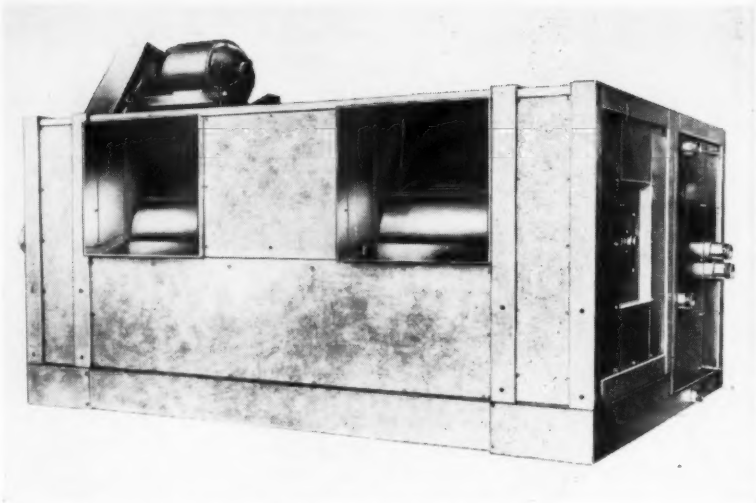
Relative humidity is, of course, an obvious factor to anyone who pays attention to weather reports. Some hot days are pleasant because they are relatively dry. Others, lower in temperature readings, may be intolerable because of the dampness in the air. Most travelers have discovered that an eighty degree day in New York is far more unpleasant than a hundred degree day in Arizona.

Circulation of air

The cooling effect of air movement requires little comment. However, it is worth noting that cooling is only partially a by-product of air movement. True, moving air does take away body heat. But it also takes away body moisture. Air that has become saturated with perspiration does not absorb more. When this moisture is not removed, discomfort results, both because of the moisture itself, and because the evaporation process, which is itself a cooling measure, is inhibited.

An air-conditioning unit may produce disappointing results simply because it fails to move the cool air properly. Maladjusted or ill-sized units may cause cool air to collect in pockets where it remains motionless. Thermometers may record the proper temperature, but lack of circulation can cause discomfort to workers. Such situations can generally be remedied by trial and error adjustment of louvers.

There are other considerations involved whenever a new installation is first turned on. Almost invariably, there is someone in the office who cannot be comfortable at the same temperature the others are. To some degree this may be psychological—natural weather of the same temperature might be perfectly satisfactory, but the knowledge that it can be changed by the turn of a dial introduces another element.



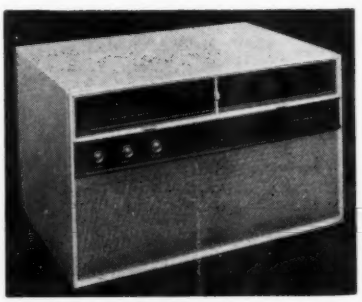
Carrier Corporation's System Weathermaker, a central air conditioning unit, can be assembled for small or large buildings.

Some companies tell stories of curing complaints about overly cold offices by such simple measures as repainting the walls in "warm" colors.

Many find relief from allergies through the filtration of dust and pollen from the air. Common sense, of course, dictates that a certain amount of caution should be exercised when one is working within air-conditioned spaces. For instance, it is unwise for a heavily perspiring person to enter a chilled room abruptly. By the same token, a person who has been working in a 75 degree temperature feels the unpleasant effect of emerging into a 90 degree afternoon. Whether the change from cool to warm is injurious to health has not yet been determined, although it is conceded to have aforementioned psychological disadvantages.

Many factors must be considered in making the proper choice of an air conditioning unit aside from human or machine considerations. A particular space cannot simply be measured and a unit capable of cooling that many cubic feet installed. Some spaces are just naturally cooler than others. A cellar will remain cooler than an attic; rooms with northern exposure are cooler than those which face south or east. With heat variations from room to room, it is obvious that

The Unitaire line of Westinghouse self-contained air conditioners is available in 15 to 50-ton capacities. The MU model shown here is capable of producing from 267,700 to 361,000 BTU's per hour. Units of this capacity generally require extensive duct-work for air distribution.



The Frigidaire Imperial room air conditioner features quiet operation while producing 10,000 BTU's per hour. For chilly days the unit will create 8,300 BTU's of heat on reverse cycle, and 8,500 BTU's by separate electric heater.

Kelvinator portable room air conditioner operates on a 115-volt, 7.5 ampere circuit; it is 16-inches wide, 12 inches high.

cooling requirements must change with the amount of heat to be eliminated.

There are a number of sources of heat for offices—the sun, the body heat of human beings, electrical equipment, etc. Heat, like water, tends to seek its own level. It flows from hot places to cool. If the furnace is turned off after five on a winter day, the heat within soon passes through the walls to the outside air. Similarly, a cool room quickly warms up after sunrise on a hot day.

It is thus evident that the cooling of a space depends not only on the amount of heat in it, but on two other conditions, also. These are, first, the difference between the inside temperature and that outside, and, second, the degree to which heat is free to flow from hot areas to cooler spots. In other words, the ability of walls, windows, ceilings, and floors to insulate an area is an all-important element.

It must be noted that heat is, of course, never really destroyed by air conditioning, merely removed. In ordinary window units, the heat is simply exhausted into the outside air. In larger units it must be blown through ducts to the outside, or transferred to water, which carries it off. If a system is installed in an area where the water supply is plentiful, the water used in cooling may drain into the sewage system. In areas where the water supply is scarce, the water is run to a tower where it gives of excess heat and is redistributed through the system. Manufacturers are now making larger air cooled systems to meet the limitations imposed by a lack of abundant water supply in some areas. In the smaller units, the trend seems to be to make lighter, more streamlined units, while at the same time retaining or adding additional cooling capacity. Units of one ton are now available in 15 volts with an amperage of seven and one half.

Many improvements in control design have been developed with the emphasis upon thermostatic regulation. Such control is designed for more efficient and economical use.

Many units use a reverse cycle heat pump as a source of quick warmth. By turning the cooling system in reverse, heat is taken from the outside air and deposited in the space hitherto cooled. Enough heat is present in relatively cold air to make this heating source adequate for unexpected cold snaps, when it would not be economical to use the major heating plant.

The noise problem

Research in regard to the noise produced by air conditioners has resulted in quieter fans and blowers, and more adequate duct insulation. Among other improvements, new methods of air filtration have been introduced. Almost all air conditioning units utilize a method of filtering dust and dirt from the air. In areas where dust interferes with the operation of delicate machinery, the filter is a necessity, Most filters are of the permanent type which may be easily removed for cleaning.

Some models are equipped with electrostatic filters; these filters may also be bought as separate units for independent operation, or for use in conjunction with existing systems. Some filters of this type are a combination of an activated carbon filter and electromagnetic plates to relieve the air of dust, pollen, and odors. One manufacturer includes a germ-killing device in the filter.

Dehumidifiers are incorporated to some extent into every air conditioning unit, as extraction of excess moisture from the air is just as important as cooling it. In moderate yet moist temperatures, a dehumidifying unit will condition the air satisfactorily without the added expense of a cooling unit.

Fans and air circulators create a cooling effect by moving the air. A fan requires an intake of fresh air and a sufficient outlet for exhaustion of the stale air. Many fans are equipped with timers, thermostats, or filters.

The Manufacturers

The following list covers the principal manufacturers of various types of air conditioners.

The codes used in this list are as follows:

BWA—"Built-in-wall" air conditioners, air cooled.
C—Equipment for use with centralized air conditioning systems.
D—Dehumidifiers.
H—Humidifiers.
MI—Miscellaneous.
PA—"Packaged" air conditioners larger than room size, air cooled.
PW—"Packaged" air conditioners larger than room size, water cooled.
RCA—Room size console air conditioners, air cooled.
RCW—Room size console air conditioners, water cooled.
WA—Window type air conditioners, air cooled.

Abbeon Supply Co., 179 Jamaica Ave., Jamaica 32, N. Y. (D;H)

Admiral Corp., 3800 Cortland St., Chicago 47. (BWA;D;PA;WA)

American Blower Corp., Div. of American-Standard, Detroit 32. (C;D;PA;PW)

Amana Refrigeration Inc., Amana, Iowa. (BWA;C;WA)

American Motors Corp., Kelvinator Div., 14250 Plymouth Rd., Detroit 32. (BWA;D;WA)

Bryant Mfg. Co., 2020 Montcalm St., Indianapolis 7. (PA;PW)

Carrier Corp., 300 S. Deddes St., Syracuse 1, N. Y. (BWA;C;PA;PW;RCA;WA)

Chrysler Corp., Airtemp Div., 1600 Webster St., Dayton 4, Ohio. (BWA;PA;PW;WA)

The Coleman Co., Inc., 250 N. St. Francis St., Wichita, Kans. (PW)

Cory Corp., Fresh'nd-Aire Div., 3200 W. Peterson Ave., Chicago 45. (D;H;WA)

Crosley Div., Avco Mfg. Co., 1329 Arlington Ave., Cincinnati. (WA)

Curtis Mfg. Co., 1905 Kienlen Ave., St. Louis 20. (PA;PW;RCW)

Daffin Mfg. Co., Lancaster, Pa. (H)

Drayer-Hanson, Inc., 3301 Medford St., Los Angeles 63. (BWA;PW;

REC;RCW;WA)
Dryomatic Corp., 806 N. Fairfax, Alexandria, Va. (D)
The Ebco Mfg. Co., 265 N. Hamilton Rd., Columbus 13, Ohio. (D)
The Emerson Electric Mfg. Co., 8100 Florissant Ave., St. Louis 21. (BWA;D;MI-Portable model; PW;WA)
Fedders-Quigan Corp., 52-01 Flushing Ave., Maspeth 78, N. Y. (BWA;D;PA;PW;WA)
Friedrich Refrigerators, Inc., 1117 E. Commerce St., San Antonio 3, Texas. (PA;PW;WA)
Frigid, Inc., 128-168 32nd St., Brooklyn 32, N. Y. (D;WA)
General Electric Co., Air Conditioning Div., Tyler, Texas. (C; PA;PW;WA)
General Motors Corp., Frigidaire Div., 300 Taylor St., Dayton 1, Ohio. (BWA;PW;WA)
Gibson Refrigerator Co., Div. of Hupp Corp., Greenville, Mich. (D;PA;WA)
Ilg Electric Ventilating Co., 2850 N. Pulaski Rd., Chicago 41. (F;MI-Cabinet-type air conditioner;PA; WA)
Lewyt Mfg. Corp., 43-22 Queens St., Long Island City, N. Y. (BWA)
Philco Corp., Tioga & C Sts., Philadelphia 34. (BWA;PA;RCA;WA)
Remington Corp., 171 Wiley St., Auburn, N. Y. (C;D;RCA;RCW; WA)
Servel, Inc., 119 N. Morton Ave., Evansville 20, Ind. (C)
Spitzka Mfg. Co., 235 Colfax St., No. Sacramento, Calif. (MI-Portable evaporative coolers)
The O. A. Sutton Corp., 1812 W. Second St., Wichita, Kansas. BWA;C;F;PA;WA)
The Trane Co., Second & Cameron Ave., La Crosse, Wis. (C;PA; RCA;RCW)
Typhoon Air Conditioning Co., 505 Carrol St., Brooklyn 15, N. Y. (PA;PW)
United States Air Conditioning Corp., P. O. Box 360, Delaware, Ohio. (PW)
Viking Air Products, 5601 Walworth Ave., Cleveland 2. (H)
Walton Laboratories, Inc., 1186 Grove St., Irvington, N. J. (H)
Welbilt Corp., Maspeth 78, L. I., New York. (BWA)
Westinghouse Electric Corp., Air Conditioner Div., Box 510, Staunton, Va. (PA;WA)
Worthington Corp., Holyoke, Mass. (PA;PW)

The Manufacturers of Fans, Air Circulators

The codes used in this list are as follows:
C—Circulators.
CO—Oscillating circulators.
F—Fans, table.
FC—Ceiling fans.
FO—Oscillating fans.
FP—Pedestal fans.
FWA—Fans, wall.
FWI—Fans, window.
MI—Miscellaneous.

Air Controls, Inc., 2310 Superior Ave., Cleveland 14. (FWI;FWA)
Cory Corp., Fresh'nd-Air Div., 221 N. La Salle St., Chicago 1. (FWI)
Diehl Mfg. Co., Finderne Ave., Somerville, N. J. (FWI;CO)
The Emerson Electric Mfg. Co., 8100 Florissant Ave., St. Louis 21. (FWI;FWA;FC)
Fasco Industries, Inc., P. O. Box 509, Rochester, N. Y. (F;FO;FP)
General Electric Co., Bridgeport, Conn.(MI)
Hunter Fan & Ventilating Co., Div. of Robbins & Myers, Inc., 2500 Frisco Ave., Memphis 19, Tenn. (F;FC;FWI)
Ilg Electric Ventilating Co., 2850 N. Pulaski Rd., Chicago 41. (F; FC;FWA)
Kisco Co., Inc., 2400-40 DeKalb St., St. Louis 4. (C;FWI)
Phil Rich Fan Mfg. Co., Inc., 2900 Caroline St., Houston 4. (C;F; FP;FWI)
Radex Corp., 2076 Elston Ave., Chicago 14. (MI-electronic air cleaner)
The Stratfield Co., 434 Grand St., Bridgeport, Conn. (MI-Special fan for photographic darkrooms)
Superior Electric Products Corp., 1507 Independence St., Cape Girardeau, Mo. (F;FWA;FWI)
Viking Air Products, 5601 Walworth Ave., Cleveland 2. (FWI: F)
Westinghouse Electric Corp., 3 Gateway Center, Pittsburgh, Pa. (FWI;FWA;F)

Intercommunications, Dictating and Transcribing Equipment

Dictating and transcribing equipment has been strongly influenced by our electronic age. Improvements have been made in the areas of higher portability, with a high degree of product efficiency; new recording mediums provide a means to better recording fidelity, which in turn, increases working efficiency.

Battery powered models are another feature which add to the flexibility of dictating machines.

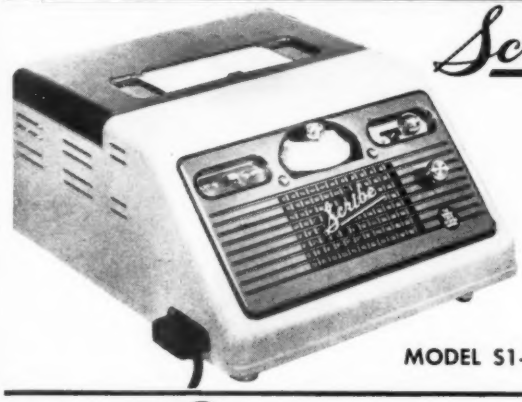
Because of the rugged, simple-to-operate, portable dictating unit, salesmen have been released from the "chains" of having to carry on full-time business operations in an unstable atmosphere. A salesman who makes several calls per day, cannot write down all of the important points he wishes to remember after each interview. He usually waits until he reaches the hotel room at night to jot down important facts. And often, he doesn't remember them.

However, a salesman who is equipped with a portable dictating machine can emerge from an interview, press a button, dictate his ideas, reactions, resolutions, and forget about it for the rest of the day. His mind is free for the next contact.

In special cases he might immediately dictate a letter to the client just interviewed, drop the recording into an especially prepared envelope, and mail it to the home office. Upon arrival, the letter is then transcribed by a stenographer, and mailed immediately to the client. Such an expedient sales followup often makes the difference between good representation and just plain pounding the pavement.

Unfortunately, an executive is not always able to coordinate his dictating chores with the normal work load of his secretary. With dictating and transcribing units, or a combination unit, correspondence, instruction, etc., may be accomplished at the convenience of the

Scribe®
DICTATION SYSTEMS
provide substantial cash savings for 1 or 50 dictators



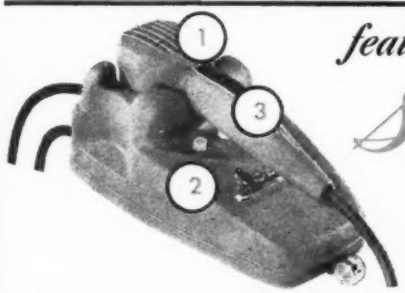
MODEL S1-70

Scribe CLEAREST RECORDING, MOST DEPENDABLE FOR REMOTE OR NETWORK COMMUNICATION

SCRIBE S1-70 remote is a rugged commercial size dictating machine. Scribe records your voice with unmatched clarity on high fidelity Mylar magnetic tape—pre-loaded in 30 minute tape magazines. All operations are controlled by finger tip touch with the exclusive "Miracle Mike" desk station. Work load permitting, one Scribe serves as both recorder and transcriber. Scribe remote dictation systems are versatile—ideal for switchboards, intercom systems or any recording need from one to fifty dictators.

Other models for individual use.

Thousands of dependable Scribe machines are in use in Government, business and industry.



featuring **Scribe**

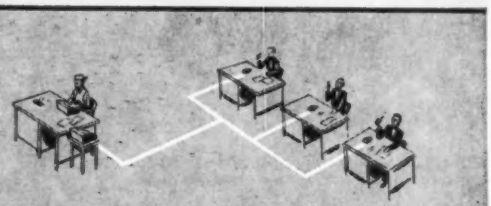
EXCLUSIVE MIRACLE MIKE

1. Desk set button punches time indicator card on machine at secretary's desk to indicate length and end of each letter and automatically indicates end of dictation when microphone is replaced.
2. Lights signal when machine is in use.
3. "Miracle Mike" gives you finger tip control of *all* functions of the machine.

DEALERS—WRITE FOR PROTECTED TERRITORY INFORMATION.

REPRESENTATIVE REMOTE INSTALLATIONS

Single executive "Miracle Mike" desk set connected to Scribe S1-70 remote recorder transcriber. Machine permanently at secretary's desk.



Three executive "Miracle Mike" desk sets with Single S1-70 Scribe remote recorder and S1-60 transcriber. Allows dictation and transcribing at same time.

Six executive "Miracle Mike" desk sets connected to 2 Scribe S1-70 remote recorder-transcribers. When either machine is in use (indicated by light on executive station) selector switch on desk set permits other dictators to select idle machine. Separate transcriber need depends on work load requirement.

LET US PROVE IT! SEND COUPON TODAY

SCRIBE DISTRIBUTORS CO. DEPT. OM-9
6949 W. North Ave., Oak Park (Chicago), Ill.
Rush me cost-saving facts on Scribe.

Name _____

Company _____

Address _____

Number of Dictators _____ Check — Dealer ☐ User ☐

A PRODUCT OF SCRIBE INTERNATIONALE, A DIVISION OF GENERAL SINTERING CORPORATION—Franklin Park, Illinois.

"What was J.L's attitude on this?"

Tandberg 4
3-SPEED • 4-TRACK
TAPE RECORDER/PLAYBACK
tells you
• what was said
• how it was said
• who said it

Minutes, hours, months after the conference, every word, every nuance of expression is faithfully preserved on tape with the Tandberg 4.

The Tandberg 4 adds pinpoint accuracy to your post-conference decisions. Whisper-quiet, unobtrusive, easy to operate, it will record **up to 17 hours on a standard 7" reel of tape!** Its handsome, wood-grained mahogany finish is a compliment to the good taste of your office.

Complete with microphone, input-output cables, luggage carrying case, take-up reel, instruction manual, $349.50.

ACCESSORY REMOTE CONTROL FOOT PEDAL
Tape recorder will operate only when foot pedal is depressed; stops when foot pedal is released. You can record only pertinent sections of conversations. Or, your secretary can transcribe entire conversations without constant rewinding to locate skipped portions.

TANDBERG 4F (same as Model 4, but complete with remote control foot pedal and 4-ft. cable) **$399.50.**

Want more information? Drop a card to Dept. O1

Tandberg of America, Inc.
8 Third Avenue • Pelham, New York

executive without calling upon the secretary to work late, or interrupting her normal working routine. Thus, a maximum of flexibility is obtained with a minimum of lost time due to uncoordinated activities.

A multiple dictating system is often employed by large companies whereby a number dialed on the telephone connects the person with a central dictating and transcribing pool. This is perhaps the simplest method of dictating for the executive and it provides a system of equal work distribution among stenographers in the pool.

The conveyor belt, although not so widely used in office operations, has proved to be a useful device when applied to office systems and work flow. Pneumatic tubes were essentially designed for the use of companies having inter-dependent departments on separate floors or in hard-to-reach areas of the building. Information which is sent through a pneumatic tube is usually meant to be acted upon immediately. Conveyor systems work between separate floors as well as in large open areas where desks are placed along the line to receive documents which flow through.

Dictating-Transcribing Equipment Manufacturers

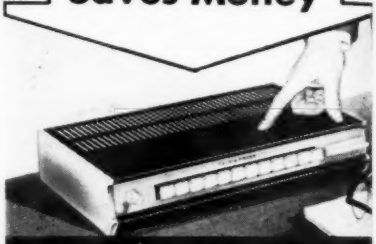
The principal manufacturers of dictating and transcribing equipment of various types are contained in the following list.

Code symbols in the list are as follows:

MB—Equipment employing magnetic belt.
MD—Equipment employing magnetic disk.
MP—Equipment employing magnetic paper.
MS—Equipment employing magnetic sheet.
MT—Equipment employing magnetic tape.
N—Network systems.
PB—Equipment employing plastic belt.
PD—Equipment employing plastic disk.
TR—Tape recorders modified for office use.

American Geloso Electronics, Inc., 312 Seventh Ave., New York (MT)
American Dictating Machine Co., Inc., 51 W. 45th St., New York 36. (MD;N)
Ampro Corp., 2835 N. Western Ave., Chicago. (TR)
Calculator Equipment Corp., 556 Central Ave., Orange, N. J. (MS)
Cole Steel Office Machines, Inc., 415 Madison Ave., N. Y. (MT)
Comptometer Corp., 1735 N. Paulina St., Chicago 22. (MB)
Dictaphone Corp., 420 Lexington Ave., New York 17. (PB)
De-Jur Amsco Corp., 45-01 Northern Blvd., Long Island City 1, N. Y. (MT;MS)

Saves Time,
Saves Steps,
Saves Money



TALK-A-PHONE
INTERCOMMUNICATION
The Accepted Symbol of Quality and Dependability

Only the New TALK-A-PHONE has these exclusive features!

• **DYNASONIC SELECTOR.** Select station performance, intermix or change as needed.

• **MULTI-MAGIC STATION SELECTOR.** Up to 50-station capacity in same attractive cabinet.

• **"PRIVATE" or "NON-PRIVATE" MASTERS and STAFFS.** Converse in privacy, answer calls from a distance.

• **NOISE-FREE, VOICE-RANGE POWER.** Rugged, All-Transistor, high-gain amplifier provides exceptional clarity and naturalness of tone.

PLUS . . . Incoming Call Chime; Busy Signal; Monitoring Signal; External Relay Control; Reciprocal Power Supply . . . all as standard features of the New TALK-A-PHONE

•

Proportioned like a book, only 3-inches high. The look and feel of fine-grained leather, with the strength and rigidity of steel. In charcoal gray and brushed chrome.

•

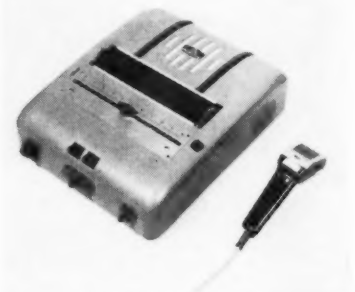
A.I.A. File Number 31-i-51

Write for free brochure and name of nearest distributor

TALK-A-PHONE CO.
Dept. OM-1
5013 N. Kedzie Ave.,
Chicago 25, Illinois

New Dictaphone telegram recording-reproducing machine does two jobs simultaneously. According to manufacturer, teletypist can transcribe on the teletypewriter the messages recorded by one of the machine's units while other unit continues to record.

"Traveler" portable dictating machine is manufactured by SoundScriber Corp. The unit records messages on plastic discs.



Vanguard is dictator-transcriber combination. From Calculator Equipment Corp., it uses exclusive Sound Letter Sheets.

Thomas A. Edison Industries, McGraw-Edison Co., West Orange, N. J. (N;PD;TR)

EBC America Corp., 243 Broadway, New York 7. (TR)

Geiss-America, 6424 North Western Ave., Chicago 45. (MT-Magnetic tape or wire)

The Gray Mfg. Co., 16 Arbor St., Hartford, Conn. (PD)

Magnedisk Dictating Co., 52 E. Brink St., Crystal Lake, Ill. (MD)

Michigan Electronics Inc., 854 N. Rockwell, Chicago 22. (MT)

Miles Reproducing Co., Inc., 812 Broadway, New York 3. (N;PB)

Minnesota Mining & Mfg. Co., 900 Bush Ave., St. Paul, Minn. (MT)

Mohawk Business Machines Corp., 944 Halsey St., Brooklyn 33, N. Y. (MT;N;TR)

North American Philips Co., Inc., Dictating Equipment Div., 230 Duffy Ave., Hicksville, L. I., N. Y. (MT)

Olkon Research Corp. of America, Vanguard Business Machines Div., 150 Sylvan Ave., Englewood Cliffs, N. J. (MP; MT;N;TR)

Pierce Dictation Systems, 5900 N. Northwest Highway, Chicago 31. (MB;N)

Scribe International, Div. of General Sintering Corp., 10005 Franklin Ave., Franklin Park, Ill. (MT; N;TR)

The SoundScriber Corp., 6 Middletown Ave., North Haven, Conn. (N;PD)

Stenocord of America, Inc., 29 Broadway, New York 6. (MB)

Intercommunication equipment manufacturers

The following list covers the principal manufacturers of intercommunications equipment of various types.

The code symbols in the list are as follows:

C—Conveyer systems.

EH—Systems employing a form of "electronic handwriting."

F—Equipment of the facsimile type.

MI—Miscellaneous.

P—Pneumatic tube systems.

PD—Paging equipment of the direct wire type.

PMI—Paging equipment, miscellaneous.

PR—Paging equipment using radio.

PSA—Paging equipment using an automatic switchboard.

PSM—Paging equipment using a monitored switchboard.

PW—Paging equipment of the "wireless" type.

T—Teletypewriter equipment.

VD—Voice equipment of the direct wire type.

VMI—Voice equipment, miscellaneous.

VR—Voice equipment, using radio.

VSA—Voice equipment using an automatic switchboard.

VSM—Voice equipment using a monitored switchboard.

VW—Voice equipment of the wireless type.

Action Systems Co., 34 Cambridge St., Meriden, Conn. (PD;VD)

Aircall, Inc., 224 E. 38th St., New York. (PR)

Airmatic Systems Corp., 441 Market St., Saddle Brook, Rochelle Park, N. J. (P;C)

Allied Radio Corp., 100 N. Western Ave., Chicago 80. (PD;VD)

American Development Electronics Co., 210 Central Ave., Newark, N. J. (VD)

American Dynamics Corp., 1445 City Line Ave., Philadelphia 31. (VMI)

American Telephone & Telegraph Co. (Bell Telephone), 195 Broadway, New York. (T;VSM)

Auth Electric Co., Inc., 34-20 45th St., Long Island City 1, N. Y. (PD;PR;PSM;VD;VSM)

The Autocall Co., 160 Tucker Ave., Shelby, Ohio. (PD)

Automatic Electric Sales Corp., Northlake, Ill. (VSA; PSA)

Bliss Electronic Corp., Box 366, Sussex, N. J. (PSA;VD;VSA)

Bogen-Presto Co., Box 500, Paramus, N. J. (VD)

Cambridge Co., 224 N. Desplaines St., Chicago. (PD;VD)

Carter Industries, 520 Fulton Ave., Yonkers, N. Y. (MI-Telephone dial lock)

Continental Mfg., Inc., 1612 California St., Omaha, Neb. (PD; VD; VMI-background music)

S. H. Couch Co., Inc., 3 Arlington St., N. Quincy 71, Mass. (PSA; VD;VSA;VSM)

Dictograph Products, Inc., 95-25 149th St., Jamaica 35, N. Y. (PR; VD;VR)

DuKane Corp., 103 N. Eleventh Ave., St. Charles, Ill. (PD;PR; PSA;VD;VR;VSA)

Edwards Co., Inc., 90 Connecticut Ave., Norwalk, Conn. (VD;PD)

Electronic Communications, Inc., 1501 72nd St., St. Petersburg, Fla. (F)

Electro-Vox Intercom Corp., 9 E. 54th St., New York. (PD;PSA; VSA;VD)

Executone, Inc., 415 Lexington Ave., New York. (PD;MI-sound systems; VD)

Federal Telephone & Radio Co., 100 Kingsland Rd., Clifton, N. J. (PR;PSA;VR;VSA)

Fannon Electric Co., Inc., 98 Berriman St., Brooklyn, N. Y. (PSA; PSM;PW;VSA;VSM;VW)

Feiler Engineering & Mfg. Co., 8026 N. Monticello Ave., Skokie, Ill. (PW;VW)

Grover Co., 25525 W. Eight Mile Rd., Detroit 19. (P)

International Business Machines Corp., 500 Madison Ave., New York 22. (MI-Data transceivers)

Interlex Systems, 22 Thames St., New York 6. (C;P;PR;PW;T; VD;VR;VSA;VW)

Kay-Townes Mfg. Co., Box 593, Rome, Ga. (VD)

Kellogg Switchboard Supply Co., 6650 Cicero Ave., Chicago. (PD; PSA;VD;VSA)

Kleinschmidt, Inc., County Line Rd., Deerfield, Ill. (T)

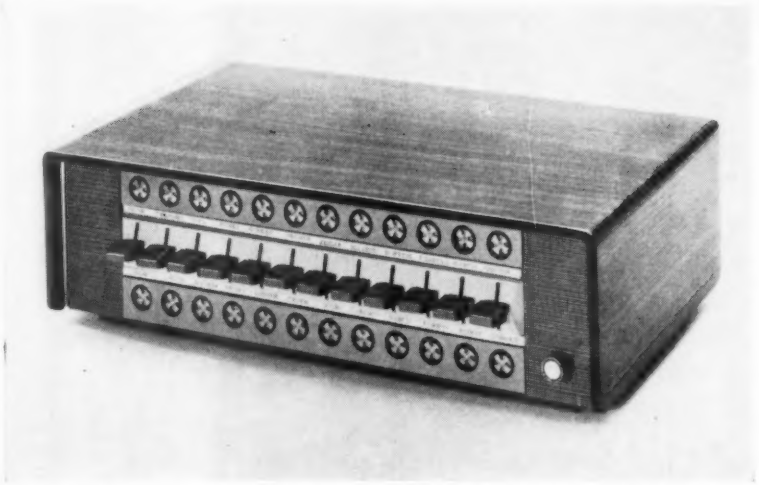
Lamson Corp., 10 Lamson St., Syracuse, N. Y. (C;P)

Line Electric Co., 271 South 6th St., Newark, N. J. (PD;PSM)

J. M. Loge, Sound Engineers, 2171 W. Washington Blvd., Los Angeles 18. (PD;VD)

Office worker stands beside Intrafax transmitter and recorder, a product of The Western Union Telegraph Co. This unit accommodates letter-sized messages. The company also offers note-size and ticket-size models, as well as map machines.

So-called "new look in telephones" is this "Call Director," developed by Bell System for business people whose jobs require the placing or receiving of many calls a day. Accessible push buttons were designed for busy executives or secretaries who answer calls for a number of people, Bell says. With the touch of a button, users can connect with other office phones, set up inter-office conference calls, or "add on" other extensions to incoming calls. The unit comes with as many as 30 push buttons or as few as 12, depending on user's requirements.



"Executive" component is part of new fully transistorized intercommunication system offered by Dictograph Products, Inc. This unit has newly developed "magic eye" to indicate who has called, and to automatically leave message if executive is away.

Mercury Industries, Inc., 356 Broadway, Hillsdale, N. J. (C)

Michigan Electronics, Inc., 854 N. Rockwell, Chicago. (VD)

Mohawk Business Machines Corp., 944 Halsey St., Brooklyn, N. Y. (MI-Recording unit for transmitting paging calls)

Motorola Communications & Electronics, Inc., 4501 Augusta W. Blvd., Chicago. (PR;VR)

North American Industries, 101 W. 31st St., New York. (MI-telephone amplifier)

North Electric Co., 553 S. Market St., Galion, Ohio. (PD;PSA;VD; VSA;VSM)

Philco Corp., Tioga & C. Sts., Philadelphia. (PR)

Radio Corp. of America, Front & Copper Sts., Camden 2, N. J. (PD;PSA;VD;VSA)

Rauland-Borg Corp., 3535 W. Addison St., Chicago. (PD;VD)

Servus-Fone, Div. of Motiograph, Inc., 4441 W. Lake St., Chicago. (PSM;VSM)

Mark Simpson Mfg. Co., 32-28 49th St., Long Island City 3, N. Y. (PD; PW;VD;VW)

Smith-Corona, Inc., 701 E. Washington St., Syracuse 1, N. Y. (T)

Wm. M. Smith Co., 20 Ferguson Ave., Broomall, Pa. (PD; VD)

Stromberg Carlson Co., Div. of General Dynamics Corp., Special Products Div., 1400 N. Goodman St., Rochester, N. Y. (PD; PSA; VSA)

Stewart-Warner Electronics, Div. of Stewart-Warner Corp., 1826 W. Diversey, Chicago. (F)

Talk-A-Phone Co., 1512 Pulaski Rd., Chicago. (PD;PW;VD;VR;-VW)

Tandberg of America, Inc., 8 Third Ave., Pelham, N. Y. (TR)

TelAutograph Corp., 8700 Bellanca Ave., Los Angeles. (EH;MI-closed circuit TV for data information; T)

Telecom, Inc., 1019 Admiral Blvd., Kansas City, Mo. (PSA;VSA)

Tele-Norm Corp., 55 W. 42nd St., New York 36. (PD;PSA;VD;VSA)

The Teleregister Corp., 445 Fairfield Ave., Stamford, Conn. (MI-Special electronic reservations systems)

Times Facsimile Corp., 540 W. 58th St., New York 19. (F)

Transelectric Mfg. Co., 53 Hopewell Rd., Oxford, Pa. (VD)

Vocaline Co. of America, Inc., 100 Bristol Bldg., Old Saybrook, Conn. (PW;VW)

Webster Electric Co., 1900 Clark St., Racine, Wis. (PD;VD;VW)

The Western Union Telegraph Co., 60 Hudson St., New York. (F; T)

The Wheeler Electronic Corp., 150 E. Aurora St., Waterbury 20, Conn. (VD)

Wheelock Signals, Inc., 273 Branchport Ave., Long Branch, N. J. (PD)

Copying and Duplicating Equipment

The paperwork problems indigenous to all busy offices would probably be completely insurmountable without copying and duplicating equipment.

One manufacturer while praising copying equipment in general, said that a firm which makes an average of five copies per day of any paperwork can save about 275 man-hours a year by using a photocopy machine instead of typists to handle the regular copying work. And in larger offices where 50 copies of various originals are required daily, the same type of machine might save close to 2,800 man-hours.

The benefits offered by duplicating equipment are, perhaps, even more obvious. For runs of 100 copies or more, they are self-evident. In instances of comparatively short runs, i.e. 50 copies, duplicating methods can still provide a great increase in efficiency.

The expediency derived from the use of copying and duplicating equipment can, of course, also be measured in terms of economy, as well as time.

What exactly determines a company's need for copying and duplicating equipment? One manufacturer of copying machines claims that when the typing load becomes so great that another typist must be added to the clerical staff in order to ease the burden, a copying machine will save both time and money.

Such machines do much to eliminate bottlenecks. For instance, a pressured executive can have his secretary make copies of papers passing through his hands and pass them on, almost immediately, to the next man in a routine system. Furthermore, he can do so without having to wait until his secretary is free to type a copy. And most copying machines will pick up notations he may

COMPARISON OF OFFICE COPYING PROCESSES

COPYING PROCESSES. These processes are used to copy original material, including letters, art work, photographs, drawings, letterheads, etc. They are ordinarily used for making from one to ten copies, though new photocopy processes make multiple copies relatively economical, and most copying processes can also prepare stencils or masters for one or more of the duplicating processes.

Process	Speed*	Cost Per Copy*	Can Process Enlarge or Reduce?	Duplicating Processes for Which Stencils or Masters Can Be Prepared	Characteristics of the Process
Diazo	200-800 copies per hour	about 1 cent	No	Offset	Copies are positives, in various possible colors. Translucent, one-sided originals required, or translucency must be made first. Process sensitive to most colors, less so to purples.
Facsimile	1 copy in 3 minutes	5 cents	No	Offset; Stencil; Gelatin; Spirit	Copies are positives on specially treated paper. Process is used widely for wire communications, is getting increased use for stencil cutting.
Photocopy	1 copy in 15 seconds —1 minute	4-9 cents	Most cannot	Offset; Stencil (in special units)	Copies are positives on white or colored coated paper; some units make negatives. Sensitive to wide range of colors. Can make translucencies for diazo process. Some units can make several prints from one negative, and a number of companies now offer single-sheet multiple-copy processes, which utilize the original negative as master.
Thermography	1 copy in 4 seconds	4½-5 cents	No	None	Copies are positives on buff or colored paper having a wax-like finish which can be reinforced with heavier backing. Process less sensitive to some kinds of ink.
Verifax	1 copy in 50 seconds; 5 in 1 minute	9-10 cents (single); 2-4 cents (multiple)	No	Offset	Copies are positives on bond or similar non-sensitized paper. Several prints can be made from one matrix. Process is otherwise similar to photocopying.
Xerography	1 copy in 3 minutes	5 cents	Yes	Offset; Spirit	Copies are positives on various kinds of paper or film. Process is widely used to make offset masters. It is sensitive to wide range of colors. Can make translucencies for diazo process.

*Speed and copy costs are estimates for letter-size copies using materials of average quality and runs of average length. As circumstances vary, figures above or below those listed may be obtained. Speed figures allow not only for machine differences but for differences between manual and power operation.

wish to add to the original material, so that answers to questions, opinions, etc. need not be written on a separate sheet.

Besides the usual things, duplicating equipment increases efficiency in complicated systems work as when information on a spirit master is transferred selectively to different forms covering the same transaction. A duplicator used to transfer repetitive information from form to form in the course of the work is, in essence, an elementary form of integrated data processing. Some machines, in fact, can select certain lines and/or headings from one set of forms, and print them onto smaller forms.

These machines are extremely valuable in accounting and sales departments, in inventory control, and a variety of other office applications.

Machines in both the duplicating and copying fields have been made more versatile by improvements in their design, sensitivity, etc. But probably the greatest improvement in versatility stems from the increased use of copying and duplicating equipment in combination with each other.

For example, most copying equipment can be used to make masters for use with at least one of the duplicating processes. This means that complicated material which might once have taken many hours of patient and skilled work to transfer to a duplicating process master, can be transferred to such a matter easily, and accurately. It can then be reproduced, by that duplicating process, at high speed, and inexpensively.

Which process is best?

And how does one determine which process or combination of processes would best serve his needs?

The first procedure is to analyze those needs. For instance, suppose a company's home office receives, throughout the week, a considerable amount of correspondence from outside agencies. In each case, the original material must be filed, and copies must be sent to the regional representative and the district manager. For this purpose, the company would probably choose a copying machine.

At the end of each week, however stock reports, which often include sketches of displays, are prepared for distribution to numerous branch offices throughout the country. For this purpose, the company would probably choose a machine which uses one of the duplicating processes.

Each company's needs must be adjudged individually. Some companies may need only copying equipment, or only duplicating equipment. One company may find that an elaborate systems machine is feasible; another may find that a simple machine, perhaps a portable, which is inexpensive and practically foolproof in operation, is what it needs.

There are about a dozen distinct processes which can be used for copying or duplicating exclusive of such methods as ordinary carbon paper, automatic typing, conventional printing methods, microfilm reproduction, or the output of integrated data processing systems.

Naturally, no one process can serve every need. Some copying processes cannot copy two-sided material; others cannot pick up certain colors. Some are satisfactory when only a few copies are needed, but are relatively slow or costly

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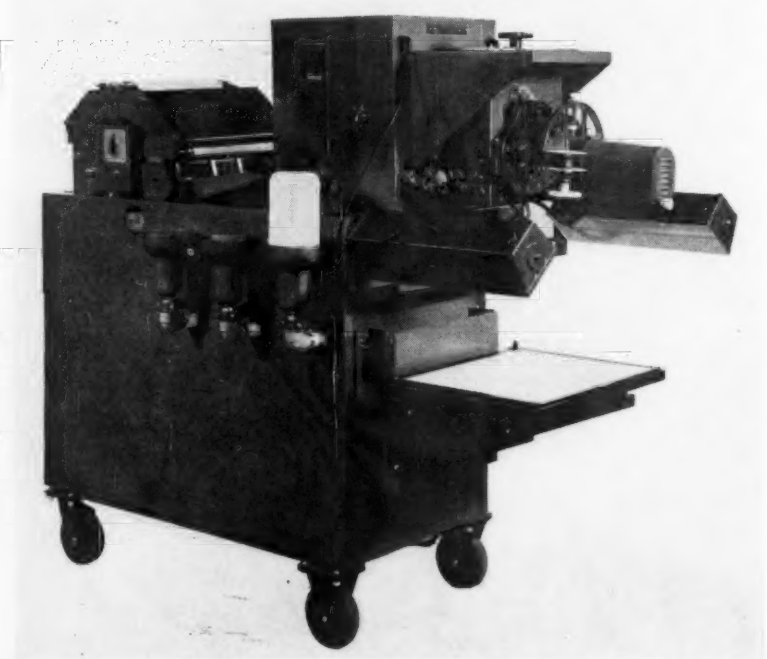
Eastman Kodak's new photograpnic system for reproducing documents of all kinds quickly and clearly is demonstrated by worker. System is called Ektalith Method.



Photocopying machine which features microfilm enlarger attachment is Model Expeditor made by Photostat Corporation.

when multiple copies are required. Some can produce multiple copies at high speed, but cannot be used to reproduce certain types of materials.

However, because of the wide variety of processes available to choose from, the chances are fairly good that a machine or machines can be selected which will save both time and money, and produce copies of precisely the quality required.

Six of the processes described below are intended primarily for copying. These are diazo, facsimile, photocopy, thermography, verifax, and xerography.

Copying equipment is used to make copies of existing material without normally requiring the preparation of some intermediate, such as a master or stencil.

Such equipment is essentially designed for making relatively few copies of any one original. (However, the number of copies that can be made has been increased in some cases, most notably in the case of certain photocopy equipment, which, using recently developed chemical compounds, is designed to make multiple copies from one negative. (See "Photocopy" below).

Copying equipment can copy drawings, art work, and in many cases even photographs, directly from the original.

Duplicating equipment, on the other hand, is intended to make long runs at high speed, and at low cost per copy. In practice, each of the duplicating processes requires an intermediate, such as a master, stencil, or set type. Six processes are considered in this category: gelatin, offset, relief, special liquid, spirit, and stencil.

Even within the two categories—duplicating and copying—there is a wide range of differences. Some offer advantages of speed, some of low cost, some of quality appearance in the finished work—or a combination of any of these and other features.

The pages that follow describe, under separate headings, each of the twelve processes.

The Copying Processes

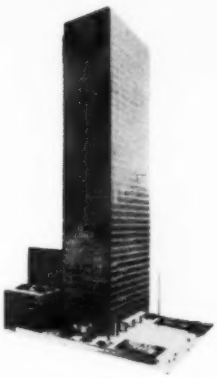
Photocopying

Photocopy processes employ the principles of conventional photography, so modified as to make photocopy machines convenient, reasonably simple office tools.

Depending on the combination of principles employed, true photocopying can take several different forms. All of them employ the chemistry of photography — as opposed, for example, to the chemistry of xerography, the diazo process, or thermography. All of them employ a mechanical arrangement in which copies are made through direct contact with sensitized materials — as opposed to the use of a camera or other optical systems.

The "transfer" method of photocopying is one in which the original material is normally placed face to face with the sensitized sheet which will become the negative. Original

CHEERS FOR JOSEPH E. SEAGRAM & SONS, INC., New York, whose office layout, design and working efficiency have won the Office Management award as "OFFICE OF THE YEAR." And an essential part of Seagram's equipment is the Davidson DUAL-LITH room.



What Goes On In the Davidson Room of the "OFFICE OF THE YEAR?"

This is Miss Virginia Arrington, of Joseph E. Seagram & Sons, Inc., New York. As Manager of the Stenographic and Duplicating Department, it's part of Miss Arrington's job to supervise a mighty important room at Seagram's. It's called the Davidson Room – and inside are two Davidson DUAL-LITHS (Models 221 and 241). Not only are we delighted to be so memorialized . . . we're doubly pleased that Miss Arrington says: "We'd be lost without those DUAL-LITHS!"

Seagram uses its DUAL-LITHS to print a wide variety of forms, sales bulletins and promotion material for its offices all over America. They are used for simultaneous two-sided printing (a Davidson exclusive which saves 50% on press time), color work – and perforating or scoring without a separate operation. And Miss Arrington adds these words of praise: "DUAL-LITH's positive chain feed means excellent register for color work. What's more, we can run any paper – from tissue to card stock. And when it comes to maintenance, we've found that every part is 'easy-to-get-at.' Another thing we like: Davidson's DUAL-LITH is extremely durable. We run these machines virtually without a breather. And the savings we realize every day in work load, materials, and – most important of all – time, are truly impressive!"

WE'RE HAPPY that DUAL-LITH is so highly thought of in this "OFFICE OF THE YEAR." If *you'd* like to know more about the finest small offset equipment in the world, drop us a line today for free booklets and the name of your Davidson Distributor.

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and sensitized sheet are exposed to light in a "printer," or in the "printing" slot of a combination machine. Light passes through the copy sheet to the original where the dark areas (lines and letters) absorb it, and the lighter areas reflect it.

This reflected light produces a reaction in the light-sensitive coating of the copy sheet, altering it chemically so that it turns dark when it is developed.

Since copying cameras use true photographic procedures, the original must be exposed, and the final print must be developed, fixed and washed. For convenience, such equipment may be equipped with a drying section in order that the copies, which would otherwise have to dry for a few hours, will emerge in immediately usable condition.

These cameras are most often equipped with a prism arrangement, so that they can provide a negative which reads from left to right. If a black-on-white copy is desired, it can be obtained either by processing the negative as a new original or by using materials that will produce black-on-white positives in one step.

New developments cut costs

Chemical compounds which are designed to extend the photocopy method to situations where multiple copies are required, at less than prohibitive prices, have recently been developed.

The photocopy process is as yet not suitable for long runs, and the production of a great number of inexpensive copies; but the process, noted for its ability to produce exact copies of good appearance, is now suitable for use in situations where, say, 15, 25, or even more copies are desired.

Manufacturers differ in the details of their methods, but basically, all require the use of specially coated paper, and a special solution, containing both developer and stabilizer, or two solutions, where activator and stabilizer are separate, and the developer is actually in the paper itself.

In all cases, the reduction in price as compared to transfer photocopying is affected by using only one sheet for each copy, after the original negative whether it is mirror-image, as in the transfer process, or right-reading, as in an autopositive process—has been made. Thus, the original negative in effect becomes a master for making further copies. If your company already has photocopy equipment, you may simply need to add an auxiliary processing unit (or in some cases, depending on the brand, merely a processing tank), in order to use these processes, since any photocopy printer can act as the light source to expose the negative.

However, if your company is investing in photocopy equipment for the first time, you might wish to consider a machine which is now offered, which is a combination printer and processor, capable of making single, autopositive, copies and/or multiple copies.

Variety of equipment available

Photocopy equipment, whatever the method used, is generally available in the form of separate printers, separate processors, or combination models. Combination models are generally of the continuous-flow type, and cannot copy from bound volumes. Many companies, however, offer flat-bed printers, which can copy either flat or bound material.

Photocopying produces exact copies of the original, and is sensitive to a wide range of colors. While most photocopy paper is white, it is possible to obtain it in other colors, for color coding and other uses.

Copies can also be made on film or on translucent materials, a convenient method for copying opaque or two-sided originals for reproduction by the diazo process.

Some office photocopying machines can also make offset masters.

The verifax process is a variant of photocopying. It differs from the latter in that it can make copies on ordinary, non-sensitized papers, and in its ability to produce at least five copies from a single exposure to the light source.

In the verifax process, the original material is placed face-to-face with a sheet of sensitized paper which is called a "matrix." Original and matrix are exposed to a light source in such a way that the light passes through the matrix to the original. Thus, in this first step, the process corresponds to that used in most transfer photocopying. As in that process, the dark areas of the original absorb the light, while the lighter areas reflect it.

Where the reflected light strikes the light-sensitive matrix, a chemical reaction occurs, which inactivates those areas of the matrix.

After exposure to the light source, original and matrix are removed, and the matrix is placed in the developing section of the unit, where it is processed by an "activator" solution.

Those areas on the matrix which correspond to the dark areas of the original now react to form a dark, dye-like substance. It is this substance which is transferred to the final copy sheet.

To effect the transfer, a sheet of non-sensitized copy paper is placed face-to-face with the matrix, as it emerges from the developing unit. The two sheets are pressed together by squeegee rollers. As a result, a layer of the dye is transferred to the copy paper, to make the final reproduction of the original.

However, not all of the dye produced is thus removed. Enough remains on the matrix to make about four more copies; though if lighter copies are acceptable, with care up to ten can be made.

Since the final copy does not pass through a solution, it emerges completely dry.

The verifax process, like the photocopy process, can copy a wide range of originals: art work, letterheads, typed, drawn, or hand-written material, and coarse-screen photographic half-tones. Since it uses the reflex method of exposure, it can copy opaque or two-sided originals without an intermediate step.

Copies can be made on card stock, and, if desired, on both sides of a sheet.

The process can also make offset masters in about one minute using an accessory unit.

The first copy takes about fifty seconds to make, but additional copies can be made much more rapidly.

Thermography

Thermography is the correct name of the process which is more commonly known in office use by the brand-name of the machine which uses it: Thermo-Fax.

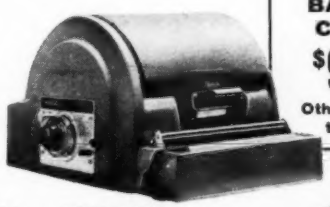
Everything's perfectly clear—they're Verifax copies!

Verifax copies are dry, white, easy-to-read . . . accurate in every detail. They won't fade or darken . . . will last as long as typed records. And they're as easy to handle, file or mail. All of which is mighty important in business.

See how you can make 5 of these dry, more usable copies in 1 minute for 2½¢ each with Kodak's $99.50 Verifax Bantam Copier, which outperforms other makes of copiers costing up to 4 times as much!

Phone local Verifax dealer (see Yellow Pages under duplicating or photocopying machines), or write Eastman Kodak Company, Business Photo Methods Division, Rochester 4, N.Y.

Prices quoted are manufacturer's suggested prices and subject to change without notice



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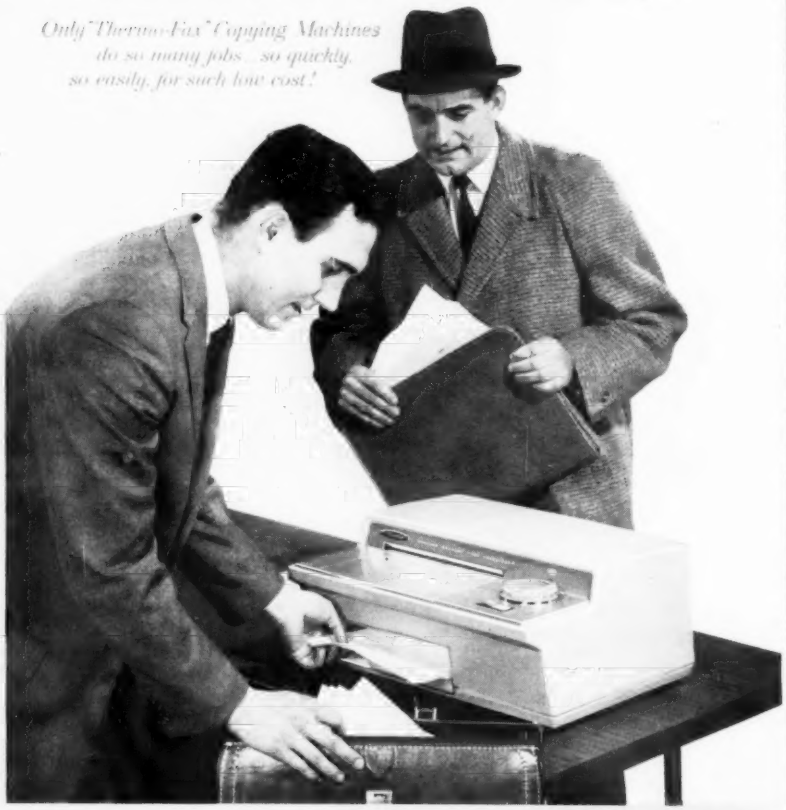

"Machines that mean business"

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The process makes use of the fact that dark substances, such as office ink, tend to absorb more light than light-colored substances. In the process of absorbing light, the dark substance generates heat. It is heat that "burns" the copy paper, producing the image.

The copy paper used is heat-sensitive, and responds to heat by turning dark.

Mechanically, the process operates as follows. The copy paper is placed, with its heat-sensitive coating face up, on top of the material to be copied. In the Thermo-Fax machine, the two sheets are exposed to an infra-red light source. The light passes through the copy paper to the original.

Where the light strikes, the darker areas formed by letters, lines, numbers, etc., it is absorbed, generating heat. The portions of the copy paper directly above the lines and letters turn dark, thus reproducing the material beneath.

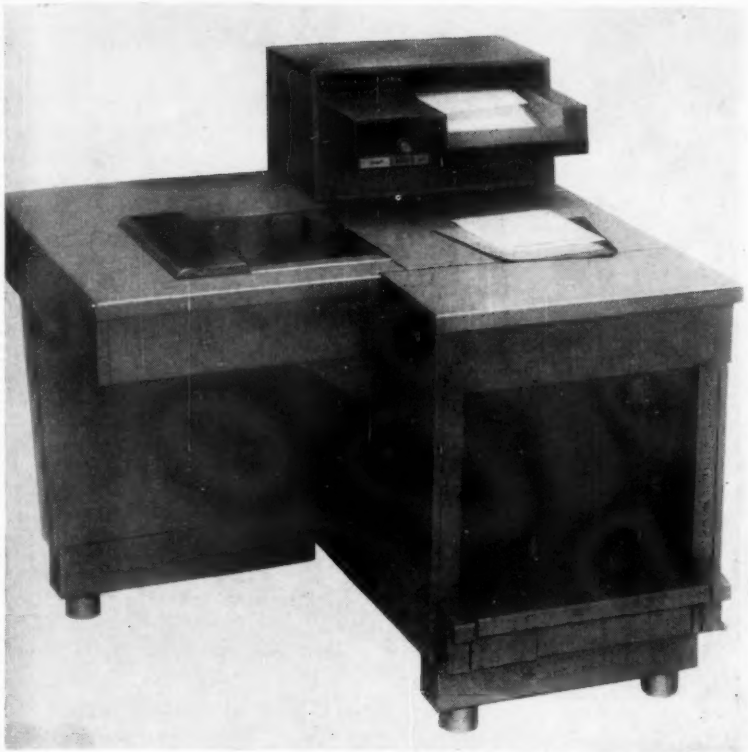
Thus, in the thermographic process, copies are produced in a single step. Since no solutions are used, the copies are completely dry when they emerge from the machine.

It is a rapid process; letter size copies can be made in about four seconds.

Equipment for the process is available in two types: flat-bed printers, which can copy from bound material, and continuous models. Machines of the continuous type are designed so that original and copy paper are inserted into the machine, and are then brought before the light source, and out of the machine again by mechanical means.

The process is most successful in copying materials printed in a heat-absorbing ink, such as those with a carbon base, or in pencil. Certain inks, particularly some of the blue ones, may not record at all. These may be utilized to make notations on the original which are not desired on the copies.

The copy paper is translucent, and has a smooth, wax-like finish. Standard paper is buff-colored, but other colors, and white, are available. Printing is blue-black. The copy paper is light-weight; if reinforcement is desired, inexpensive back-up paper may be bonded to it within the machine itself.



For the modern office—new Xerox 914 Copier which is said to be first fully automatic office copying machine on market. Push-button unit is made by Haloid-Xerox.

Speed and savings are boasts of new "Quick Silver" photocopier developed by Peerless Photo Products. Combination unit, which contains automatic exposing and processing sections, uses new silver-photography process for photocopying. It can reproduce copies from single sheet of sensitized paper at rate of four per minute, at cost of five cents per copy. Office worker in photo above holds master sheet which can make "unlimited" number of copies, and which can be filed for future use. Unit is also available as processor said to be adaptable to other photocopy machines.

Xerographic process

The xerographic process makes use of the fact that like electrical charges repel each other, while unlike charges attract.

In the actual process, the following steps occur:

First, using a copying camera, the image of the material to be copied is projected onto a coated plate, which bears a positive electrical charge. Light acts on the plate to cancel the electrical charge.

Since light is reflected only by the lighter-colored portions of the original, the plate retains its charge in those areas corresponding to the dark lines and letters of the original. Thus, the image has now been copied in the form of an invisible electrical charge.

In the developing process, a dark resinous powder carrying a negative electrical charge is passed over the plate. Because unlike electrical charges attract, the powder adheres to those areas of the plate which represent the letters and lines of the original, making the image visible.

To make the copy, a sheet of paper, positively charged, is placed over the plate. A portion of the negatively charged powder is attracted to the paper. (It is possible to obtain up to eight copies from the powder which remains on the plate).

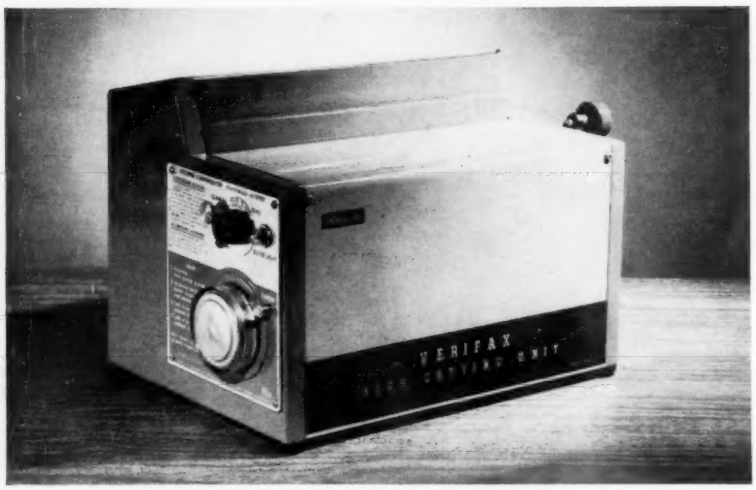
The paper, with the powder adhering to it, is then placed in a "fuser," where it is exposed to heat. This embeds the powder firmly in the paper, producing a permanent copy.

In the same manner (and at the same time that paper copies are being made), a paper offset master can be produced.

The process can also make presensitized positive working metal offset plates, spirit masters, and translucent copies for use with diazo process equipment.

The xerographic process can copy typed and handwritten material, drawings, art work, photographs, letterheads, etc. The original material can be opaque and two-sided, since the image of the original is reflected on the plate.

Large-scale photocopying machine is Bruning's Copyflex, model 675.



On the smaller side—trim and compact Verifax Book Copying Unit.

Copies are most often black on white paper, but paper of various colors and weights can be used. Some cameras permit enlarging and reducing.

While single copies generally take about three minutes to make, some new equipment using the xerograpic process is of the continuous-flow type. Here, the entire process proceeds automatically, once the original material has been fed into the machine, thus making possible high speeds.

Haloid Xerox, Inc. has recently introduced the new Xerox 914 Copier, which is said to be the first fully automatic office copying machine to appear on the market to date. According to Joseph C. Wilson, president of the company, the new push-button copier was specifically designed for use in the modern office. He states that it requires no sensitized or treated papers nor does it require any exposure or developing adjustments. The required number of copies may be made simply by setting a dial. There is no need to handle the copy paper, or rehandle the original for the multiple copies. In this respect it resembles a short-run duplicating machine rather than the conventional copier.

Facsimile process

The facsimile process, while generally used as the basis for communication devices, has certain copying and duplicating applications which are useful in office work.

Most facsimile equipment is basically designed for long-distance communication (it is used, for example, to transmit telegrams directly from a central office to the office of a subscriber). In effect, it provides single-copy duplication at a distance. However, it can also provide copies close at hand, and some equipment is now designed for office use.

These office-type machines are used to make copies or, more particularly, to transfer material to stencils, and to offset, gelatin and spirit masters, for use on standard duplicating machines.

The process itself is basically a photo-electric one. Both the original material and the sheet on which the copy will appear are "scanned" simultaneously, and in synchronization. In most cases, the material to be copied is wrapped around a rotating drum. The copy sheet is wrapped around a second drum which rotates in synchronization with the first. A narrow light beam passes in a continuous track over the entire surface of the material to be copied.

This light beam is reflected into a photo-electric cell. There it generates a current which varies with the strength of the reflected light. (The strength of the light depends upon whether it is being reflected from a light or a dark area.)

The current thus generated is transmitted to the receiving unit of the machine, where it activates a stylus, which passes over the face of the copy sheet, in synchronization with the original light beam. Through the stylus, the electric current "burns" the image onto the sensitized copy sheet. The machines are so designed that the current passing through the stylus produces dark areas which exactly correspond to those of the original material, thus producing a facsimile copy.

In some machines, the material to

(*To page* 112)

William H. Donaldson, left, Upjohn's assistant chief accountant in charge of data processing, points out to Ray T. Parfet Jr., center, vice-president, the high quality and contrast of a reduced-size xerographic copy of an original sales report held by Edward C. Ritsema, head of the duplicating department.

Upjohn Saves 8 Days a Month on Sales Reports to Field

The Upjohn Company, one of the country's leading pharmaceutical manufacturers, mails a sales analysis report to each of its salesmen monthly. Copies of the report are also sent to members of the company's sales management. Five or six copies of each report may be needed, a monthly total of approximately 17,000.

The original reports are made up on a data-processing printer from the 50,000 tabulating cards air-expressed daily to Kalamazoo by the company's 18 branch sales offices. At the close of each month, every effort is made to get these reports reproduced and in the hands of the salesmen as quickly as possible.

Before Upjohn installed a XeroX® Copyflo® 11 continuous printer, it required an average of three or four hours by conventional copying methods for Upjohn's reproduction department to turn out the necessary copies for *just one* of the company's 18 branches.

Today, all is different, thanks to automatic xerography. Now, the same work is done in 14 minutes, and monthly sales reports are reaching the field six to eight days sooner than ever before.

Wherever low-cost, volume copying is the need, as at Upjohn, look first to automatic xerography for the happy solution. XeroX Copyflo continuous printers turn out dry, positive prints, ready for immediate use, at the rate of 20 linear feet a minute—an 8½"x11" print in less than three seconds. The printers also prepare inexpensive offset paper masters and vellum intermediates for use on offset and diazo-type duplicators, respectively.

Copyflo printers enlarge, reduce, or copy size to size. They offer the fastest, most flexible, most inexpensive way to get copies precisely like the original from microfilm or opaque documents.

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be copied is "scanned" as it enters the machine, rather than being wrapped around a drum. Units of this type can accept copy of unlimited length.

Receiving units may be modified so that the stylus can be used to make minute holes in the copy sheet. Thus, the machine can reproduce an image on a conventional stencil, for use with standard stencil duplicating machines.

Since scanning can generally be set in spacings as close as 750 to the inch, the facsimile process can be used to transfer art work (including photographs), drawings, letterheads, and other detailed material—as well as typed or written matter—to stencils. Used with suitable materials, it can copy such material onto masters for gelatin, offset, and spirit duplicators, or prepare translucent copies for use with diazo equipment.

Diazo

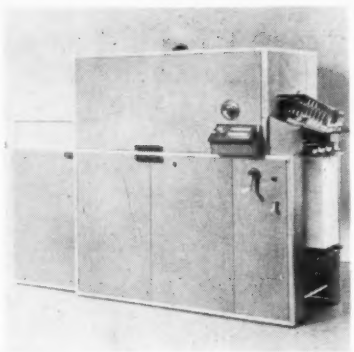
The diazo process utilizes a dye, formed by the interaction of two chemicals, to create the lines of which letters and drawings are made, and thus produce copies. The chemicals are a diazonium salt (or "diazo") and a combining element known as a coupler.

The diazo itself is affected by exposure to light; when it is exposed to light, it can no longer react to form a dye. In the copying process, the letters and lines of the material to be copied actually act as a light shield, so that the diazo is left active where lines and letters are to appear on the copy. This active diazo interacts with the coupler to form the dye.

There are two basic methods used:

In the first method, copies are made on a sensitized sheet, which contains both the diazo and the coupler. These chemicals are prevented from reacting by a third chemical, the "stabilizer."

The material to be copied is placed face up over this sensitized copy sheet, in the diazo machine. A strong ultra-violet light is passed through the original to the sensitized sheet. This light passes through the original wherever there are no lines or letters. Wherever the light passes through the original, the diazo on the sensitized sheet is



Pictured is one version of A.B. Dick's Videograph Printer. When printing facsimile information, it can operate remotely from separate scanning unit. It also prints computer information with separate, "Character Generator."

broken down, so that it cannot react to form a dye when the "stabilizer" is removed.

The "stabilizer" is removed by being neutralized by another chemical. Ammonia is such a chemical. In this first process, the sensitized sheet, after it has been exposed to light, is exposed to ammonia in the form of a vapor.

The ammonia vapor neutralizes the "stabilizer," and the active diazo which remains on the copy sheet combines with the coupler immediately. This produces the desired copy.

In the second method, the sensitized sheet contains only the diazo. The sheet (covered by the original) is exposed to ultra-violet light just as in the first method. It is then brought into contact with a solution containing the coupler. The dye-forming reaction takes place as it does in the first method, producing the desired copy.

The first and second methods have often been referred to as "dry" and are misleading. While the second process does employ a solution, it is applied with a roller, and enough heat is present so that copies emerge, for all practical purposes, dry.

Although, with either method, two steps are required for making copies, both are accomplished in automatic sequence within the machine.

The diazo process depends upon light passing through the original to the copy sheet, and therefore will not copy opaque or two-sided originals directly. Most office stationery is translucent enough for the purpose. If two-sided material is to be copied, a translucent copy must first be made. This can be done with photocopy, facsimile, or xerographic equipment. It can also be done directly in some diazo process equipment, using a reflex film designed for the purpose.

The final copies are positives, and may be made on paper of various colors. The printing color may also be varied by an appropriate selection of copy paper. By using hand application of chemicals, it is sometimes possible to obtain different printing colors on the same copy sheet.

Offset masters may also be prepared by the diazo process.

Diazo equipment is usually of the continuous-flow type. Original and copy sheet are advanced mechanically through the various steps. Much of the equipment is designed to handle large-size materials, such as engineering drawings, in some cases, up to 54 inches wide.

Machine speeds vary widely, some operating at speeds as high as 125 feet per minute or more, some as slowly as four feet per minute. Generally, a small model, such as one designed to handle letter-size copies, can turn out approximately 200 copies per hour.

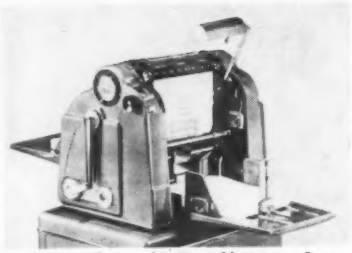
The diazo process is relatively inexpensive. Cost of a typical letter-size copy is estimated at between three-quarters of a cent and one and one-quarter cents.

Stencil

The stencil process is, perhaps, the best known duplicating method. It has often been called the "Mimeograph" process, after the trade name used by the A. B. Dick Co.

A stencil, the master used in this process, is a sheet of paper, plastic, metal, or other material, in which holes have been made, corresponding to the lines and letters to be reproduced. These holes allow ink, or another printing substance to pass through, thus creating a copy of the original on the paper or other material beneath the stencil.

Conventional office stencils are designed so that letters and lines are not cut completely through the material. This is done so that the centers of letters, such as "o" and "g" will remain in place.



Compact Stencil Duplicator from Gestetner Corp. is twin cylinder, silk screen machine. This is Model 260.

Usually, the stencil has a fibrous or porous base, through which ink can pass easily. This is covered with a waxy coating, which prevents the passage of ink.

The "cutting" of a stencil actually just pushes aside the coating where lines and letters are to be reproduced. The fibrous base remains uncut as a support for the structure of the stencil.

Stencils may be prepared by hand, using a stylus or other such instrument, by typewriter, by printing with dies, or by such means as the facsimile or photocopy processes. By using either of the latter two means, stencils can be made to reproduce relatively complex material.

Once the stencil is prepared, it is wrapped around the rotating drum of the duplicator, or, if a twin-cylinder machine is used, around the screen which encloses the two cylinders.

Ink comes through the stencil from within the drum or screen. At each revolution of the drum (or each cycle of the stencil on the twin-cylinder type of machine), a sheet of paper is fed into the machine and moves into contact with the stencil. The final copy is made by ink passing though the holes in the stencil.

Ink may be either in liquid, or, particularly for use with machines of the twin-cylinder type, in paste form. The paste form, which is available in tubes, is usually considered cleaner to use.

Copies may be printed in ink of any color, and on paper of any color. While most machines print only one color at a time, it is possible, with some equipment, to print two colors at once.

Copy paper is usually rough, primarily in order to absorb the ink quickly, and thus prevent smearing by successive copies. However, with the newer, quick-drying inks (and/or by slip-sheeting), copies can be made at a satisfactory rate of speed on better grades of paper.

Electrically operated stencil duplicators can generally operate at speeds of 180 to 240 copies per minute. Manual models usually run at speeds ranging from about 60 to 100 copies per minute.

Cost per copy varies with the length of the run, decreasing as the run increases, and with the materials used. In the case of a fairly typical run of 100 copies, cost per copy might be just over a third of a cent; the cost decreases to a much smaller fraction of a cent, if the run is increased to 1000 copies.

A properly prepared stencil of reasonably good quality should last through a run of several thousand copies. If special stencils are used (e.g. those of plastic or metal), much longer runs are possible.

Offset

The offset process, as used in office duplicating equipment, is a simplified version of the printing process known as photo-offset lithography. Like that process, it turns out work of high quality; like that process it is based on the fact that oil (or grease) and water do not readily mix.

To use offset duplicating equipment, a master or plate must first be prepared. This may be made of

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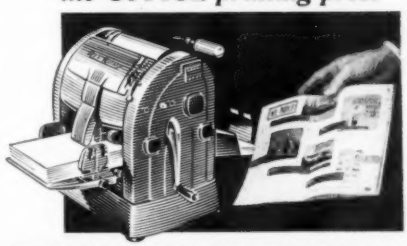

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paper, metal, or plastic. The desired material can be transferred to it with a typewriter (using an appropriate ribbon), or with any writing or drawing instrument which can produce the necessary greasy image. Offset masters may also be prepared photographically, or by such other copying processes as xerography, photocopy, verifax, diazo, and facsimile.

Whatever the method of preparation used, the resulting image appears on the master in the form of greasy lines which repel water.

The master is then wrapped around the rotating drum of a duplicator. As the drum rotates, several successive steps occur:

First, the master passes under a roller which applies a light film of water. This water adheres to the background areas of the image, but is repelled by the greasy areas corresponding to the lines and letters of the original.

The master then passes under a roller which carries ink with a special greasy consistency. This ink is repelled by the water-covered areas of the master, which form the background, but adheres to the greasy areas which represent the lines and letters. The image is now, in effect, written in ink on a water background.

In the third step, the master comes in contact with a third roller, called the blanket cylinder, which is covered with a blanket of rubber. Onto this roller, the master prints the material to be copied. It is this blanket cylinder, rather than the master, that actually prints the image on the copy paper.

This is done in the final step of the offset process. The copy paper is fed between the rotating blanket cylinder and an impression cylinder. The blanket cylinder prints the message on the paper; the impression cylinder presses the paper firmly against the blanket to insure a clear image.

The action of the blanket cylinder in "offsetting" the ink image from the master to the paper accounts for the name given to this process. It presses the ink into the paper in such a way that clear copies can be made of even such complicated originals as halftones and art work.

Printing can be done in a great variety of colors, and, since the equipment is generally of precision quality and its registration is exact, copies can be run through several times, when several different colors are desired on each copy.

The offset process is a high-speed duplicating method. The speed of operation varies with the machine and the materials used, but models for office use are available with a designed speed of 9,000 copies an hour. With some weights and qualities of paper and masters, optimum speeds are somewhat lower, but speeds from 4,500 to 8,000 copies an hour are standard.

The process is suited to runs of as few as ten copies if inexpensive masters are used. On the other hand, with some types of metal plates, it may be possible to obtain well over 100,000 copies.

While offset equipment may be more difficult to operate than, for instance, a spirit duplicator, new

COMPARISON OF OFFICE DUPLICATING PROCESSES

DUPLICATING PROCESSES. These processes are intended to make multiple copies at high speeds. A master, plate, or stencil must be prepared, or type must be set. Except for the relief process, masters and stencils can be prepared by typewriter, by hand, and by one or more of the copying processes. Costs per copy vary greatly with the length of the run and the quality of materials used. Assuming a run of more than just a few copies, costs per copy are a fraction of a cent. Because of the wide variations possible within each process, no attempt is made to compare them costwise.

Process	Speed* (Copies Per Minute)	Length of Run for Which Best Suited**	Copying Processes Which Can Prepare Masters or Stencils	Characteristics of the Process
Gelatin	10-75	10-100	Facsimile	Prints on paper with glossy finish. Best copies from purple carbon, but other colors can be used and can be run simultaneously. Copies become fainter as run continues.
Offset	75-150	10 to many thousands	Diazo; Facsimile; Photocopy; Verifax; Xerography	Copies are of high quality. Ink and paper color can be varied; one ink run at a time. Equipment requires reasonably experienced operator.
Relief	40-100	300 to 100,000	None—type must be set	Copies resemble typing or printing, depending on whether ribbon is used. Process often used for "fill-in" items and work with changing copy, since type can be changed during run. Prints one color at a time on any color paper.
Special Liquid (AZOGRAPH; COLUMBIA TRANSFER)	40-120	10-125	None at present	These three processes perform like the spirit process, but feature "cleanliness"—printing dyes are not formed until paper enters machine, to avoid stain hazard. Printing color is approximately blue-black, varying with the process. Copies become fainter as run continues. Some machines can handle spirit process as well.
Spirit	40-120	10-400	Facsimile; Xerography	Prints on paper with glossy finish. Variety of colors possible, but purple gives best results. Numerous colors can be run simultaneously. Copies become fainter as run continues.
Stencil	40-200	10 to 10,000	Facsimile; Photocopy (special units)	Copies are possible in any color ink on any color paper. Quick-drying inks permit use of bond and similar papers; other inks require rough paper. Some machines print more than one color simultaneously.

*Speed figures are estimates for letter-size copies, and allow for differences between manual and electric operation, as well as for machine differences. As circumstances vary, figures above or below those listed may be obtained.

**These figures do not represent machine limitations but are based on "practical" considerations such as cost, speed, method of operation, and other factors.

One of Addressograph-Multigraph's complete line of offset duplicators.

advances in machine design have reduced the skill necessary by making a number of operations automatic. Among these are automatic moistening of the master when it is first placed on the machine, automatic cleaning of blankets, automatic adjustment of roller pressures to accommodate varying weights of paper stock and masters, and automatic balancing of the ink and water mixture.

The initial purchase price of offset machines is still relatively high, but the cost per copy, particularly in the case of runs of 100 copies or more is very low; a small fraction of a cent per copy. In the case of runs of 1,000 or more, the cost per copy may be as little as .003 of a cent. Cost figures, of course, vary with the quality of the materials used, as well as with the length of the run.

Spirit

The spirit process, sometimes referred to as the "fluid," "liquid," or "liquid hectograph" process, gets its name from the fact that it uses alcohol as a solvent for the aniline dyes with which it prints.

While it is chemically similar to the gelatin process previously described, it employs a different mechanical system.

As the first step in the process, a master must be prepared, using special paper with a special carbon face-up underneath it. When the material to be copied is typed, written, or drawn onto the master, its image appears on the back of that sheet, in the form of dye transferred from the special carbon. The image, of course, appears in reversed form.

The master is placed around the rotating drum of the duplicating machine. (Some simpler forms of duplicators use a tray on which the master is placed flat.)

As the drum rotates, a sheet of glossy copy paper is fed into the machine, and moistened slightly with a solution containing alcohol. When the paper meets the master, the alcohol solution serves as a solvent acting to remove a thin layer of dye from the master. This dye is deposited on the copy paper to make the final copy.

As with the gelatin process, each copy is slightly fainter than the one before; however, with a properly prepared master, it is possible to obtain runs of several hundred copies.

Number of colors available

The standard printing color is purple, since this generally produces the longest runs and the clearest copies. However, carbons of various colors are available, and a variety of colors may be used on one master, simply by changing the carbon. Copy paper may be of almost any color.

Masters may be prepared by hand, typewriter, standard printing methods, xerography, and facsimile.

Operating speeds vary, and speed of operation has an effect on copy quality. While some equipment may be able to turn out 200 copies per minute, speeds of from 80 to 120 copies per minute are usually considered standard. Manually operated equipment is, naturally, a bit slower. Most is designed to produce copies at speeds of from 40 to 60 copies per minute.

Some spirit duplicators are designed specifically for systems work. Features for this type of use include facilities for operation from a seated position, single-cycle operation (so that different kinds of forms can be printed from the same master, with some information being added or deleted as necessary), and the actual facilities for selecting and adding information.

The process is inexpensive, and the cost per copy decreases as the length of the run increases. For a run of 100, approximate per copy cost is generally considered to be between one-third and one-half a cent.

Special Liquid

The special liquid category includes the Azograph process (made by the A. B. Dick Co.), and the Columbia Transfer process (made by Columbia Ribbon & Carbon Mfg. Co., Inc. and formerly called Transograph).

These processes are designed to produce copies with the ease and simplicity of the spirit process, but without the stain problem inherent in that process.

The essential advantage of the two methods is that they prevent the formation of printing dyes until the master is placed on the duplicator and the copy paper is fed into the machine.

In the case of Azograph, this is accomplished by separating two essential chemical agents so that they do not react to form a dye until they meet within the machine.

The masters used are prepared by typing or drawing with a special sheet (known as an Azograph transfer sheet) placed face up underneath the paper. These special sheets take the place of the conventional purple carbon used in the spirit process.

Once the master is completed, it is wrapped around the rotating drum of the duplicating machine, as in the spirit process. As the master is moistened—and not until then—the chemical agents are exposed to each other, and react to form the printing dye. This dye prints onto the paper, producing the final copies.

The Columbia Transfer process uses Columbia Transfer Sets to prepare masters. Like the other one described, this process provides for dye formation *within* the machine. Columbia Transfer Sets are available in a variety of forms, including some which are of the continuous type.

Whichever method is used, the staining problem is solved by not exposing the dyes to the operator's touch.

These processes are intended for the same type of work as the spirit process. In general, they sacrifice length of run for cleanliness of operation; it is assumed that standard runs will not exceed 100 copies by any great margin.

As with the spirit process, copies become fainter as the run progresses and the quantity of dye on the master decreases.

In many cases, the same equipment may be used for both the spirit process and one of the processes described here. Azograph duplicators, for example, handle the spirit process without alteration; older spirit duplicators, however, do not necessarily handle Azograph. Columbia states that existing spirit process equipment is suitable for use with the Columbia Transfer process.

The gelatin process, like the spirit process, makes use of aniline dyes. Both processes are sometimes called "hectograph," the spirit process being distinguished as "liquid hectograph."

While the methods are chemically very similar, they differ in their mechanical arrangements.

In the gelatin process, preparation of a master is the first step. This can be done by typing, writing, or drawing on a hectograph carbon, which is placed face down on top of the master sheet. (In the spirit process, the carbon is placed face up *under* the master). It is also possible to type, write, or draw directly onto the master, using a hectograph ribbon, ink, or crayon.

Whatever method is used, the result is a right-reading copy, in the form of deposits of aniline dye, on the master sheet.

The next step is to transfer the image from the master to the gelatin, which is the medium that will actually produce the copies. This is done by placing the master face down on a flat gelatin surface.

The dye is thus transferred from the master to the gelatin itself, which now bears the image of the original in reversed form.

To make the copies, special high-finished paper is pressed against the gelatin, one sheet at a time, and as a result of the contact, a thin layer of dye is transferred from the gelatin to the paper, thus producing a right-reading copy.

If a flat-bed machine is used, each sheet of paper is pressed against the surface of the gelatin, which is merely stretched across the machine. In duplicating machines with rotary mechanisms, the gelatin is wrapped around a rotating drum, and the paper is fed into the machine.

In either case, the gelatin usually takes enough dye from the master to make from 50 to 100 copies; but as the dye is expended, each copy is slightly fainter than the one before.

Whatever dye is not used up will gradually sink into the gelatin, usually within a period of 24 hours. The same gelatin can then be used to take the image of a new master. In many flat-bed machines, the gelatin is in roll form, so that a portion of it can be advanced at the end of a run to copy a new master; thus a new run can be made without waiting for the dye to be absorbed by the gelatin.

Copies, as with the spirit process, are usually in purple dye on white paper. Dyes of other colors can be used, and any number of colors may be used on the same master, simply by changing the color of the carbon, ink, or crayon used. However, purple has been found to produce the sharpest copies and the longest runs.

Speed of operation varies from about 10 copies per minute on a flat-bed machine, to as many as 75 per minute with a rotary machine.

In any case, the process is extremely inexpensive, considering not only the cost of the supplies, but the cost of the equipment itself. Per copy costs are measurable in small fractions of a cent.

Relief

The relief process prints from embossed or raised letters, as does, for example, an ordinary typewriter or rubber hand stamp. The letters may be inked directly, as in the case of a hand stamp, or they may print through an inked ribbon, as does a typewriter. Most machines can use either method.

Relief process equipment, for office use, generally prints from raised meta (or rubber) type, which is set by hand into channels on either a rotating drum or a flat printing head, depending on the design of the equipment.

To make a copy, paper is fed between the type (inked by a roller or covered by an inked ribbon) and an impression surface. In the case of a rotary machine, this surface is an impression cylinder.

If the inked-ribbon method is used, the resulting copy closely resembles typewriting. For this reason, relief process machines are often used to prepare letters or other material in which items such as names and addresses are to be filled in later.

Copies made from type which is inked directly have qualities similar to those obtainable by standard letterpress printing.

The process is especially well suited to long runs, because typesetting is a rather slow operation, and hardly worthwhile for short runs. Because of the durability of the type, runs of several hundred thousand copies can be made. Using power-driven equipment, average speeds of 6,000 copies an hour may be expected.

Paper colors and weights may be varied through a wide range. Printing colors are limited only by the availability of inks and/or ribbons. Much of the equipment is quite accurate in registration, thus making possible good re-runs in additional colors.

Once the type has been set, duplicating costs are low. Under standard conditions, per copy costs may be less than a fifth of a cent, varying, of course, with the quality of the paper used.

The Manufacturers

The following list includes the principal makers of office-type copying and duplicating equipment. Devices such as automatic typewriters and high-speed printers are included in more appropriate categories, such as Typewriters and Integrated Data Processing Equipment. ALSO SEE Microfilm Equipment.

The codes used in the list are as follows:

D—Diazo equipment.

E—Electrofax equipment.

F—Facsimile equipment, including models for stencil-cutting.

G—Gelatin equipment.

M—Microfilm equipment usable for making printed copies photographically.

MI—Miscellaneous.

O—Offset equipment of the office type.

P—Photocopy equipment.

R—Relief-type equipment.

SL—Special liquid process equipment.

ST—Stencil equipment.
T—Thermo-Fax equipment.
V—Verifax equipment.
X—Xerographic equipment.

Addo-X, Inc., 300 Park Ave., New York. (ST)

Addressograph-Multigraph Corp., 1200 Babbit Rd., Cleveland 7. (OR)

American Photocopy Equipment Co., 2100 Dempster St., Evanston, Ill. (P)

Anken Film Co., 11 Hix Ave., Newton, N. J. (P)

Bohn Duplicator Corp., 444 Park Ave. South, New York 16. (SP; ST)

Charles Bruning Co., Inc., 1800 W. Central Rd., Mt. Prospect, Ill. (D)

Burroughs Corp., 6071 Second Ave., Detroit 32. (M)

Columbia Ribbon & Carbon Mfg. Co., Inc., Herbhill Rd., Glen Cove, N. Y. (G;SL;SP)

Copease Corp., 425 Park Ave., New York 2. (P)

Copycat Corp., 215 Park Ave. South, New York 3. (D;P)

Copy-Craft, Inc., 105 Chambers St., New York 7. (P;SP)

Copymation, Inc., 5650 N. Western Ave., Chicago.

Cormac Photocopy Corp., 80 Fifth Ave., New York 11. (P)

Dansen Co., Inc., Box 566, 101 Cooper Ave. No., St. Cloud, Minn.

Davidson Corp., Subsidiary of Mergenthaler Linotype Co., 29 Ryerson St., Brooklyn 5, N. Y. (O;R)

A. B. Dick Co., 5700 W. Touhy Ave., Chicago 31. (O;P;SL;SP;ST)

Diebold, Inc., Flofilm Div., P. O. Box 127, Norwalk, Conn. (M)

Ditto, Inc., 6800 McCormick Rd., Chicago 45. (O;SL;SP)

Duophoto Corp., 236 Fifth Ave., New York 1. (O;P)

Duplicopy Co., 224 W. Illinois St., Chicago 10. (SP)

DuPrints, Inc., 1502 S. Main St., Los Angeles 15. (SP;ST)

Durst USA, Inc., 770 Eleventh Ave., New York 10. (M)

Eastman Kodak Co., 343 State St., Rochester 4, N. Y. (V)

Electronic Communications, Inc., Air Associates Div., Teterboro, N. J.

Filmsort, Div., Miehle-Goss-Dexter Inc., 50 S. Pearl St., Pearl River, N. Y. (M)

General Photo Products Co., Inc., 15 Summit Ave., Chatham, N. J. (P)

Gevaert Co. of America, Inc., 321 W. 54th St., New York. (O)

Gestetner Duplicator Corp., 216 Lake Ave., Yonkers, N. Y. (P)

Griscombe Products, Inc., 133 W. 21st St., New York 11. (M)

Haloid Xerox, Inc., 6 Haloid St., Rochester 3, N. Y. (M;X)

Milo Harding Co., 500 S. Monterey Pass. Rd., Monterey, Calif. (ST)

Hecto Products, Inc., 110 W. 17th St., New York 11. (G)

The Heyer Corp., 1850 S. Kostner Ave., Chicago 23. (G;SP;ST)

Hunter Photo-Copyist, Inc., 566 Spencer St., Syracuse, N. Y. (P)

Kenro Graphics, Inc., 25 Commerce St., Chatham, N. J. (O;MI-Process camera for offset negative;P;X)

A. Kimball Co., Rewe St., Brooklyn 1, N. Y. (R)

L&O Research & Development Corp., 134 N. Wayne Ave., Wayne, Pa. (F)

F. G. Ludwig, Inc., 66 Coulter St., Old Saybrook, Conn. (P)

Marr Duplicator Co., Inc., 53 Park Pl., New York 7. (ST)

Master Addresser Co., 6500 W. Lake St., Minneapolis 16. (SP)

Microfilming Corp. of America, 11 E. Pleasant Ave., Maywood, N. J. (D;P;X)

Microlex Corp., 1 Graves St., Rochester 14, N. Y. (M)

Minnesota Mining & Mfg. Co., 900 Bush Ave., St. Paul 6. (T)

The Multistamp Co., 527 W. 21st St., Norfolk, Va. (ST)

Nord Mfg. Corp., 366 Jericho Turnpike, Mineola, L. I., N. Y. (P)

Old Town Corp., 750 Pacific St., Brooklyn 38. (SP)

Ozalid, Div. of General Aniline & Film Corp., Johnson City, N. Y. (D)

Paragon-Revolute Corp., 177 South Ave., Rochester 4, N. Y. (D)

The C. F. Pease Co., 3969 Rockwell St., Chicago. (D)

Peerless Photo Products, Inc., Shoreham, L. I., N. Y. (P)

Pekas Duplicator Co., Lock Box 306, Lesterville, S. D. (DT)

Pelprinter, Inc., 555 Central Ave., Orange, N. J. (D)

Photorapid Corp., 1420 Oregon St., El Segundo, Calif. (D;P)

Photostat Corp., 1001 Jefferson Rd., Rochester 3, N. Y. (O;P-camera type;V)

Polychrome Corp., 2 Ashburton Ave., Yonkers 2, N. Y. (MI-adapter to make offset masters from Verifax)

The Print-O-Matic Co., Inc., 724 W. Washington Blvd., Chicago 6. (MI-Diagraphy method using special "inkless" compounds with stencils;ST)

Radio Corp. of America, Front & Cooper Sts., Camden, N. J. (E)

Recordak Corp., 415 Madison Ave., New York 22. (M;V)

Remington Rand, Div. of Sperry Rand Corp., 315 Park Ave. South, New York 10. (MI-Transcopy, Dexigraph, Plastiplate;P;ST)

Rex-O-Graphic, General Binding Corp., 1101 Skokie Hwy., Northbrook, Ill. (SP)

Rex-Rotary Distributing Corp., 387 Park Ave. South, New York 16. (F;SP;ST)

Robertson Photo-mechanix, Inc., 7440 Lawrence Ave., Chicago 31. (P)

Rovico, Inc., 318 Market St., Newark, N. J. (P)

Rutherford Duplicator Co., P. O. Box 13087, Houston 19. (ST)

S&M Distributing Co., Sip-O-Riter Products, 3875 Garland St., Wheat Ridge, Colo. (SP)

Speedliner Duplicator Co., 4404 Ravenswood Ave., Chicago 40. (SP)

Speed-O-Print Corp., 1801 W. Larchmont Ave., Chicago 13. (ST)

Standard Duplicating Machines Corp., 1935 Revere Beach Blvd., Everett 49, Mass. (SP)

Stewart-Werner Electronic, 1826 W. Deversey, Chicago. (F)

Technifax Corp., 195 Appleton Ave., Holyoke, Mass. (D;P)

Times Facsimile Corp., 540 W. 58th St., New York 19. (F)

Vari-Color Duplicator Co., 435 S. Lincoln St., Shawnee, Okla. (SP; ST)

VISIrecord, Inc., 54 Railroad Ave., Copiague, L. I., N. Y. (SP)

Weber Marking Systems, Div. of Weber Addressing Machine Co., Inc., Weber Industrial Park, Mt. Prospect, Ill. (F;SP;ST;R)

The Western Union Telegraph Co., 60 Hudson St., New York 13. (F)

Whitin Machine Works, Whitinsville, Mass. (O)

Wolber Duplicator & Supply Co., 1201 Cortland St., Chicago 14. (SP;ST)

Filing Equipment and Office Safes

The economic considerations of personnel and space conservations have dictated the necessity for good filing equipment and sturdy safes. The subject of records management is a lengthy one. And depending upon the volume of papers and records that fall under its province, it can be an extremely complex study.

Recent technical advances in the field of human communications indicate that we are steadily moving forward at an increasingly rapid pace. We are producing larger and larger quantities of data daily; this is reflected by the steady increases in the total quantity of record medium materials consumed for recording purposes. In certain classes of such human communications, a large percentage of this recorded material must be prescribed in the interest of "the necessities of commerce."

The need for the retention of records is obvious. All of us as individuals cherish and save items of interest ranging from the purely personal to items of professional and business interest. Even for an individual, it is mandatory that some items such as tax records be preserved for definite periods specified by law or statute. It is advisable to preserve numerous items for periods extending well beyond such mandatory periods.

Business, as activity which involves the coordinated efforts of individuals, cannot be conducted satisfactorily without adequate records; and duplicate records may be required at several different points. Such points may be within a single business office or work area, or they may be in geographically separated areas located throughout the city, state, country, or throughout the world. When an item has been documented, the document must be circulated to all interested parties, or copies must be provided to them. Once such documents have been acted upon, they must either be stored for future reference if they are of long-term interest or destroyed after review. The decision depends upon the importance of the matter, the number of persons concerned, and the cost of informing them. The decision regarding the disposition of a particular document hinges upon the records retention program adopted; this program is an outline of policy indicating the types of records retained and the length of the period of retention.

As today's offices find themselves faced with a heavier load of paperwork than ever before, the costs of personnel and floor space are constantly rising. Thus, it becomes essential to see that the records which must be kept are kept in the most efficient and compact way possible.

The scope of this discussion, however, is limited to a review of filing and insulated storage equipment, including office safes, that is available to office administrators, who are the best determiners of the most efficient filing hardware for their particular needs.

Although there is still a great deal of concern allotted to records retention, the new emphasis on records control is "birth control." Studies show that a great source of waste and inefficiency can be attributed to the creation of superfluous forms, carbons, memos, and other inessential or short-lived records. Certainly, it seems more than logical that the practice of reducing the number of records created and filed should eventually become as important as the length of time they are to be retained.

The primary purpose of filing equipment is to protect valuable business documents from being misplaced. The equipment, by the very nature of its manufacture, is designed for expediency and sturdiness. Great strides have been made by manufacturers in producing filing equipment and systems capable of giving business maximum protection in all phases of records management.

Two continuing trends to improve efficiency in the actual filing of records are: to make records storage more compact and to increase the speed of access to filed materials.

The redesigning of conventional filing cabinets gives added drawer space. Some cabinets feature drawers with expanding fronts which can hold more records, since working space for handling the material need not be left in the drawers. Cabinets with drawers which open fully are also space-conserving because these drawers may be filled and yet have all material accessible for work use.

Transfer cases, mainly used for storing inactive records, are available with stacking features, so that their storing is more compact. Some

Fire resistive equipment such as this ledger file by Mosler provides protection for business records. Note accessability.

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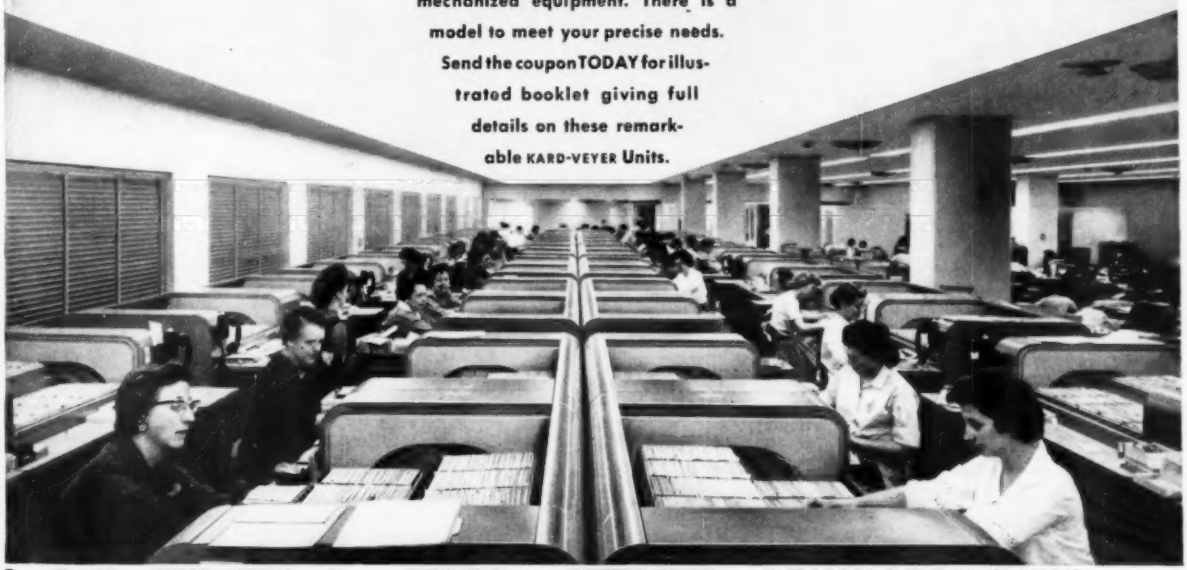

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of them are so similar to standard filing cabinets that they can be used for active records at a relatively inexpensive cost.

Because of their growing popularity, shelf units are being specifically designed with filing in mind, equipped with adjustable shelves or with frames for hanging folders. Index guides are made with tabs at the side for easy reading of material stored on these shelf units.

Some file cabinets and shelving used for filing or transfer cases are mobile and ride on tracks. Rows of these tracks can be set up, eliminating aisle space, and records are reached by pushing aside the row of filing units in front of the one desired.

The use of visible types of filing is one approach to the problem of rapid access to information. In these filing systems, one or more edges of the cards are visible, permitting fast location and return of a record. Adaptations of this system are the "vertical-visible" methods in which two or more margins are visible at once, with the cards resting side by side against dividers. Normal visible methods usually have the bottom margins of cards exposed. The cards rest in trays which may be housed in cabinets, on panels which may be mounted, on desks, or in loose leaf binders of several types.

Fire resistive equipment from Remington Rand also protects against theft. Burned records can cause ruin of business.

Another solution to faster access and filing time is the mechanized file and/or rotary files. Most mechanized files, whether manually or electrically operated, have a rotary mechanism for bringing the desired files to the operator, who is usually in a seated position. The rotation may be either on a horizontal or vertical axis. The cards themselves may be attached to a ring or other device, or may ride unattached in trays which remain in a level position.

Random filing is also beneficial in increasing the speed of information accessibility, but this has limited applications. The principle of random filing is based upon the premise that if a record can be placed in a number of different locations and still be found easily, much of the hunting time can be eliminated. An example of random filing in certain filing systems which use printed forms is designed so that from one to ten records may be filed in any order behind a visible guide. The time gained from not having to replace the record in exact sequence justifies the rapid reading of an average of five card records behind a guide. Some mechanized units use the random filing principle.

While most filing equipment serves basically to store records in order, it provides only a minimum

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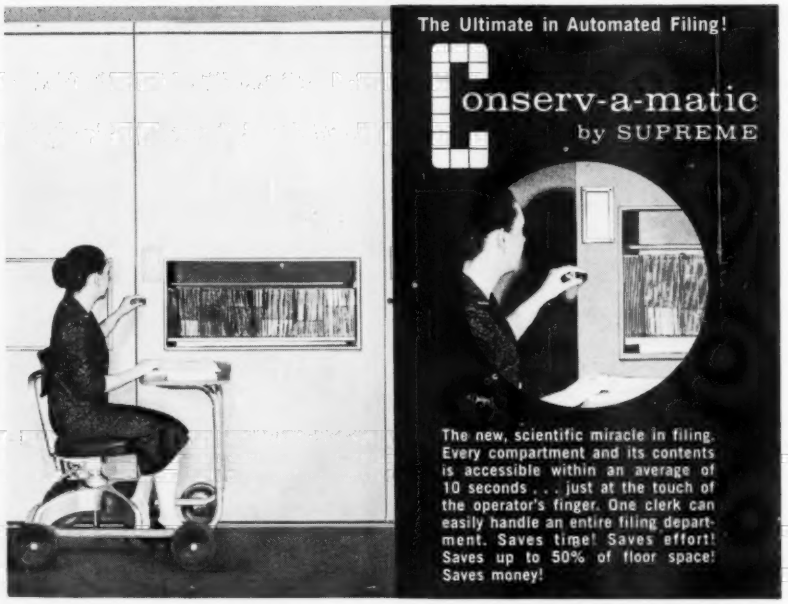
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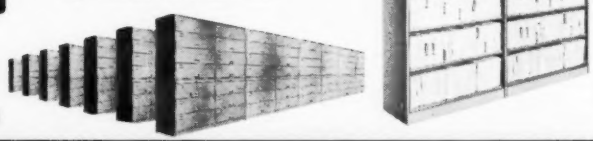

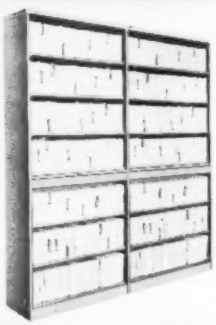

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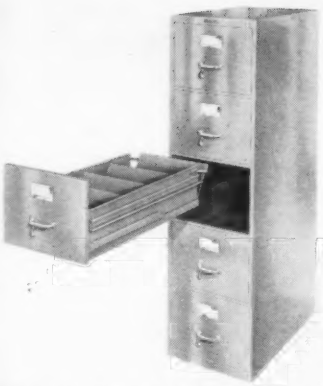

File-Master from the Shaw-Walker Co. has automatic expanding drawers providing room for more records since working space need not be confined to drawers.

of protection against fire and theft. More attention is being given to providing fire protection at the point of use, as more companies are becoming aware of the fact that nearly half of the companies which lose their basic records in fires never resume operating.

In addition to safes, a wide range of record storage equipment is offered in insulated versions for the protection of business.

While insulated record storage equipment rarely provides the same degree of safety offered by a high grade safe, it will protect records which in many cases would probable be completely destroyed in conventional types of equipment.

The purpose of any records management program must follow three basic steps of development: the saving of space, time and money. Office space is estimated at a cost of $5 to $7 per square foot throughout the nation. In cities where space is unusually sparse, the cost per square foot may rise to as much as $12. It is obvious that to maintain inactive files in an area such as this is extremely expensive; they should be transferred to lower priced storage areas. It has been said that up to 85 per cent of space, equipment, and supply costs can be regained when inactive records are transferred from premium space to lower cost long-term storage facilities.

A planned records control system under authoritative direction allows records to be retrieved in a minimum of time with a high percentage of accuracy. Taking inventory of the company's records in an effort to set up a functional control pro-

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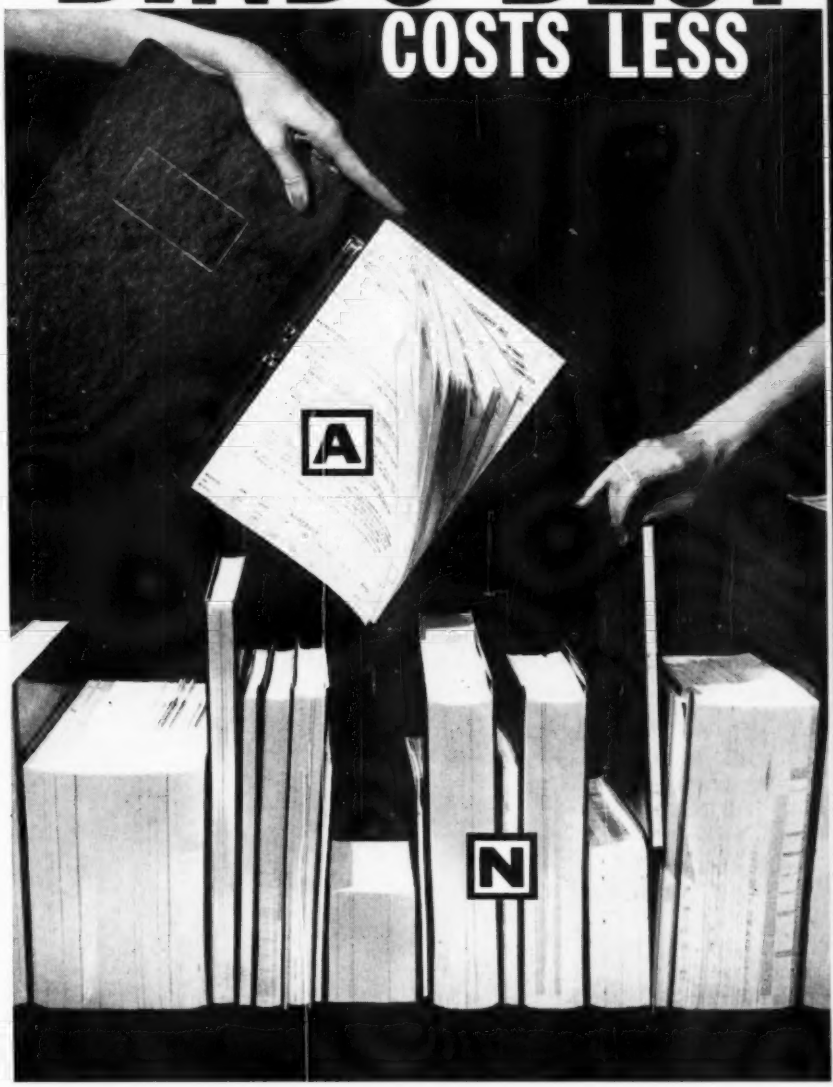

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gram is not an easy task. It follows that once a working program is formulated, the utmost care should be taken to maintain the efficiency of each of its functioning elements.

The people who do the filing should, of course, be well trained—for no matter how superior a filing system may be, one poorly trained sluggish clerk can upset the equilibrium of the entire system with his occasional bumblings.

A recent study of filing costs revealed that 80 per cent of the total cost of filing is paid in salaries. Only three to nine per cent is spent on equipment. It is estimated that more than 60 per cent in overall costs may be saved by the proper organization of the total filing system.

One of the most important factors to be considered in any records management program is, of course, the destruction of valuable records by fire. In an attempt to discover the results of fire on business operations, the Safe Manufacturers National Association (SMNA), selected 100 cases at random from its fire record files. A nationally known credit organization was asked to compile credit histories of the selected cases for a period of five years prior to the fires, and including a period of time elapsed after the fires. The analysis involved a variety of businesses from a $2,500,000 manufacturer to a crossroads store. The results of this study were rather frightening: 43 per cent of the businesses studied were not able to resume operations at all, or were out of business within six months after the fire.

According to the SMNA report, "A few cases of under-insurance were shown, but by far the greatest cause was shown to be destruction of records. Inability to produce substantiating records prevented full collection on fire insurance. Without records, unjust claims as to accounts payable could not be resisted and in many cases receivables were uncollectable due to the loss of cost, purchasing, inventory, sales or other vital records, resumption of business was seriously handicapped or made impossible."

Non-profit organizations such as the SMNA and the Underwriters' Laboratories, Inc., are actively engaged in developing improved methods for the protection of records against fire. These organizations have produced standards of protection for insulated filing and safe equipment after thorough testing under simulated fire conditions. Labels which designate the fire-resistive ability of equipment are issued by the Underwriters' Laboratories and the SMNA. The former organization acts as the testing center for equipment bearing both UL and SMNA labels. Member companies of the SMNA must submit products for testing to the Underwriters' Laboratories before they are considered by an impartial SMNA committee for further classification. If the product conforms to established specifications, it is authorized to bear the SMNA label.

The records in this fire resistive file were not destroyed. Picture courtesy SMNA.

Records are destroyed by the conductive heat of a fire as well as actual contact with flames; heat will penetrate the uninsulated barrier if the flames cannot. Paper is able to withstand temperatures of up to 350°F., but the heat generated during a substantial fire exceeds this limit by a wide margin. Therefore, it is imperative that equipment which has been insulated against fire and heat be capable of withstanding high external temperatures below 350°F. The success of insulated equipment is largely dependent upon its ability to absorb heat by conversion of water into steam—plus a number of important construction factors. Whereas older safes depend upon the free moisture retained in the cement and water mixture used for insulation, newer equipment features insulation with water retained in a permanent

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This mobile shelf filing system from Dolin Metal Products provides area flexibility.

crystalline form. The heat of a fire breaks down the crystals into water which is then transformed into a blanket of steam. Further information on this subject may be found in the November, 1959, issue of OFFICE MANAGEMENT.

Manufacturers of Filing Equipment

The following list includes the major manufacturers of various types of filing and record storage equipment. See also the list, which follows it immediately, covering office safes and protection equipment.

The code symbols used in the list are as follows:

FC—Filing cabinets.
MI—Miscellaneous.
MS—Mobile storage installations in which storage units ride on tracks mounted on the floor or suspended from above.
RM—Rotary and mechanized files; similar equipment.
SH—Shelf filing equipment, including open- and closed-shelf types.
TC—Transfer cases.
VB—Visible record equipment, binder type.
VC—Visible record equipment, "vertical visible" type.

Ace Looseleaf Corp., 27 Bleecker St., New York 12. (VB)
Acme Visible Records, Inc., Crozet, Va. (FC;MI;RM;VC;VV)
The Acorn Co., 4605 W. 21st St., Chicago 50. (FC;TC)
All-Steel Equipment Inc., 100 Griffith Ave., Aurora, Ill. (FC)
Amberg File & Index Co., 1627 E. Duane Blvd., Kanakee, Ill. (MI-portable file boxes)
American Box & File Co., 6-18 Mangum St., P.O. Box 4033, Atlanta 2, Ga. (TC)
Art Metal Construction Co., (SH; VB;VC)
Art Steel Co., Inc., 170 W. 233rd St., New York 63. (FC; MI-Blueprint files; VB;VC;VV)
Atlantic Microfilm Corp., 28 Railroad Ave., Pearl River, N. Y. (MI-microfilm files)
Atlas Stencil Files Corp., 16716 Westfield Ave., Cleveland 10. (MI-Cabinets for offset plates, stencils, etc.)
Automatic File & Index Co., 549 W. Washington Blvd., Chicago 6. (FC;TC;V)
Bankers Box Co., 2607 N. 25th Ave., Franklin Park, Ill. (TC)
The Bentson Mfg. Co., 652 N. Highland Ave., Aurora, Ill. (FC)
Blair Aluminum Furniture Co., 106 Kennesaw Ave., Marietta, Ga. (FC)
Burroughs Mfg. Co., 3002 N. Burdick, Kalamazoo, Mich. (SH)
Browne-Morse Co., Muskegon, Mich. (SH)
Business Efficiency Aids, 8114 N. Lawndale Ave., Skokie, Ill. (MI-Visible records using magnetism)
Campro Products, Inc., Canton 1, Ohio (FC)
Carteret Printing Co., 480 Canal St., New York 13. (VB; VC)
Cel-U-Dex Corp., 23 McArthur Ave., Newburgh, N. Y. (MI-Drawer dividers; SH)
Challenger Steel Products Corp., 350 Morgan Ave., Brooklyn 6, N. Y. (FC)
Cole Steel Equipment Co., Inc., 415 Madison Ave., New York 17. (FC; SH;TC;VC;VV)
Columbia Steel Equipment Co., Fort Washington, Pa. (FC;MI)
Convoy, Inc., 3424 Navarre Rd. S.W., Canton 6, Ohio. (TC)
Cook's, Inc., 207 Lakeview Ave., N.E., Blackwood, N. J. (VB)
Currier Mfg. Co., 2488 W. Larpenteur, St. Paul, Minn. (FC;MI; SH;VC;VV)
DeLuxe Metal Furniture Co., 449 Struthers St., Warren, Pa. (SH)
Diebold, Inc., 2011 Mulberry Rd., Canton 2, Ohio. (FC;RM;SH; TC;VB;VC;VV)
Dolin Metal Products, Inc., 315 Lexington Ave., Brooklyn 16, N. Y.

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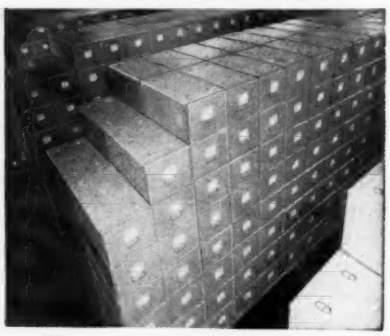

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MI-Tab card boxes; MS;SH;TC)

Dresser Products, Inc., 1058 Broad St., Providence 5, R. I. (MI-Files for coded tapes; RM)

Dunbar Furniture Corp. of Indiana, Inc. (FC)

Durable Metal Products Co., 1709 St. Marks Ave., Brooklyn 33, N. Y. (FC; MI-Roller files)

Elbe File & Binder Co., Inc., 649 Alden St., Fall River, Mass. (MI-Binder filing devices; VB)

Electrofile Div., Johnson Fare Box Co., 4619 Ravenswood Ave., Chicago 40. (RM)

Estey Corp., One Catherine St., Red Bank, N. J. (SH)

Evans Specialty Co., Inc., 2401 Venable St. East, Richmond, Va. (VC)

The Federal Equipment Co., P. O. Box 446, Carlisle, Pa. (MI-Filing cases)

Ferris Business Equipment, Inc., 60 Seymour St., Stratford, Conn. (MI-Tub files for cards; RM)

Frontier Mfg. Co., 1120 Harry Hines Blvd., Dallas, Texas. (MI-Vertical files, Map racks; SH)

The General Fireproofing Co., 413 Dennick Ave., Youngstown 1, Ohio. (FC;RM;TC;SH;VV)

General Steel Products Corp., 131-35 Avery Ave., Flushing 55, N. Y. (MS;SH;VV)

The Globe-Wernicke Co., 5025 Carthage Ave., Norwood, Cincinnati 12, Ohio. (FC;MI-Desk-side files;SH;TC;VC)

Guide System & Supply Co., Inc., 335 Canal St., New York 13. (TC)

The H-O-N Co., Third & Oak Sts., Muscatine, Iowa. (FC;TC;VC; VV)

Hamilton Mfg. Co., Two Rivers, Wis. (MI-Unit for drafting equipment)

Hamilton-Skotch Corp., 11 E. 36th St., New York. (MI-Portable check files)

Harrison Steel Desk & File Co., 4718 W. Fifth Ave., Chicago 44. (FC;TC)

Haskell, Inc., P. O. Box 5273, Pittsburgh 6, Pa. (FC)

Hedges Mfg. Co., 2931 Wentworth Ave., Chicago 16. (TC)

Herring-Hall-Marvin Safe Co., 1550 Grand Blvd., Hamilton, Ohio. (RM;TC)

Hillside Metal Products, Inc., 262-270 Passaic St., Newark 4, N. J. (FC)

Invincible Metal Furniture Co., 842 S. 26th St., Manitowoc, Wis. (FC)

Jasin Mfg. Co., U. S. 31 at Michigan Ave., South Haven, Mich. (SH)

Jayem Sales Corp., 31 Coffey St., Brooklyn, N. Y. (FC;MI-Personal files;RM;TC;VC)

LeFebure Corp., 716 Oakland Rd. N.E., Cedar Rapids, Iowa (FC; RM;VB;VC;VV)

Lit-Ning Products Co., 170 N. Robertson, Beverly Hills, Calif. (MI-Hanging folder units; SH)

Logan Business Products, Inc., Vue-Fax Div., 655 Main St., Westbury, N. Y. (VV)

Luxco, Inc., 100 King St., La Crosse, Wis. (MI-Portable filing equipment)

Lyon Metal Products, Inc., 7933 Montgomery St., Aurora, Ill. (SH)

Master-Craft Corp., Div. of The Shaw-Walker Co., 831-903 Cobb Ave., Kalamazoo, Mich. (VB)

Master Products & Mfg. Co., 3480 E. 14th St., Los Angeles 23. (SH; VV)

The Mayfair Co., 315 N. Desplaines St., Chicago 6. (TC)

The McBee Co., Smith St., Athens, Ohio. (MI-Binders for marginally punched forms)

McMillan Book Co., 701 E. Genessee St., Syracuse, N. Y. (VB)

Metalstand Co., 7520 State Rd., Philadelphia 35, Pa. (FC)

Midwest Metal Mfg. Co., 1818 N. 18th St., St. Louis 6. (FC)

Mim-E-O Stencil Files Co., 886 N. Milwaukee Ave., Chicago 22. (MI-Stencil filing units)

Mobile Racks, Inc., 369 Lexington Ave., New York 17. (MS)

Momar Industries, 4324 W. 32nd St., Chicago. (MI-Filing racks for blueprints;SH)

Monarch Metal Products, Inc., New Windsor, Newburgh, N. Y. (SH)

Moore Business Forms, Inc., 900 Buffalo Ave., Niagara Falls, N. Y. (MI-Filing cabinets for accounts receivable)

The Mosler Safe Co., 320 Fifth Ave., (MI-File drawers;RM)

National Blank Book Co., P. O. Box 791, Holyoke, Mass. (VB;VC;VV)

Norfield Methods & Procedures, Inc., 1159 S. Humphrey, Oak Park, Ill. (VB)

Northwest Metal Products Co., 1337 E. Mason St., Green Bay, Wis. (FC)

Office Equipment Mfg. Co., Inc., 2212 Summer St., Dallas. (TC)

Oxford Filing Supply Co., Inc., Clinton Rd., Garden City, N. Y. (MI-Hanging folders, mobile desk-side filing cabinets, desk drawers;TC)

The Paige Co., 114 E. 32nd St., New York 16. (TC)

Parker Steel Products, Inc., 54 N. 11th St., Brooklyn 11, N. Y. (TC)

Peerless Steel Equipment Co., 6600 Hasbrook Ave., Philadelphia. (FC)

Penn Metal Corp. of Pa., 50 Oregon Ave., Philadelphia. (FC)

Plan Hold Corp., 5204 Chakemco St., South Gate, Calif. (MS;VV)

Pronto File Corp., 415 Madison Ave., New York 17. (TC)

Ramsey Co., 16 S. Seventh St., Philadelphia 6. (MS;SH)

Record Files, Inc., P. O. Box 581, Wooster, Ohio. (SH;TC)

Recordak Corp., 415 Madison Ave., New York 17. (MI-Microfilm cabinets)

The Recordplate Co., 130 N. Fair Oaks Ave., Pasadena, Calif. (MI-Portable loose-leaf, visible equipment;VB)

Remington Rand, Div. of Sperry-Rand Corp., 315 Park Ave. South, New York 10. (FC;MS;RM;SH; TC;VB;VC;VV)

Republic Steel Corp., Berger Div., 1038 Belden Ave., N.E., Canton 5, Ohio. (FC;TC)

Royal McBee Corp., Westchester Ave., Port Chester, N. Y. (MI-Units to house firm's Keysort equipment)

Royal Metal Mfg. Co., 1 Park Ave., New York 16. (SH)

S-K Forms Co., 1907 Chestnut St., Philadelphia 3. (MI-File folders)

Security Steel Equipment Corp., Avenel, N. J. (FC;MI-Microfilm cabinets)

The Shaw-Walker Co., 1950 Townsend St., Muskegon, Mich. (FC; TC;VB;VC;VV)

The C. E. Sheppard Co., 44-01 21st St., Long Island City 1, N. Y. (VB)

Speed-O-Print Corp., 1801 W. Larchmont Ave., Chicago 13. (MI-Stencil filing cabinets)

Stacor Equipment Co., 287 Emmet St., Newark 5, N. J. (MI-Blueprint files)

Standard Pressed Steel Co., Columbia-Hallowell Div., Box 919, Jenkintown, Pa. (FC)

Stationers Loose Leaf Co., 246 E. Chicago St., Milwaukee 1. (VB)

Steel Furniture Mfg Co., 15531 Arrow Highway, Baldwin Park, Calif. (FC)

Steelcase, Inc., 1120 E. 36th St., S., Grand Rapids 2, Mich. (FC)

Steel-Parts Mfg. Co., 4630 W. Harrison St., Chicago 44. (MI-Portable units)

Stow & Davis Furniture Co., 25 Summer St., N.W., Grand Rapids 2, Mich. (FC)

Strayer Coin Bag Co., Inc., New Brighton, Pa. (TC)

Supreme Steel Equipment Corp., 53rd St. & First Ave., Brooklyn 32, N. Y. (TC;SH)

Systems Sales Co., P. O. Box 343, Binghamton, N. Y. (MI-Tab card cabinets;TC)

Tab Products Co., 995 Market St., San Francisco 3. (SH)

Todd-Hadley Div., Burroughs Corp., 6071 Second Ave., Detroit 32. (VV)

Top Flight Products Co., Inc., 6224 S. Oakley Ave., Chicago 36. (MI-Single-drawer hanging files)

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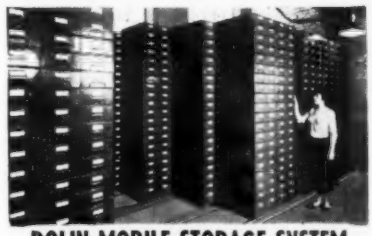

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Popular new aisle elimination idea allows 30-80% more records in your same space.

DOLIN DOUBLE-DUTY RECORDS STORAGE FILE NO. 65

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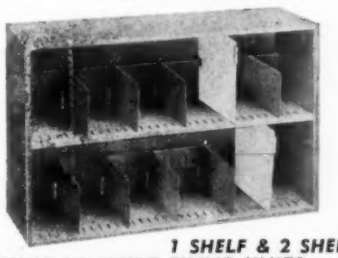

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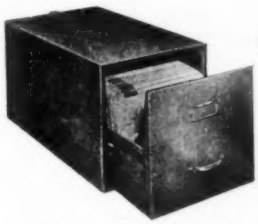
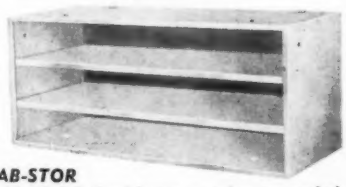
Completely assembled, ready to stack. Exclusive feature — "add-a-door" to basic units at any time.



3 COMPLETE STYLES OF STEEL TRANSFER FILES



TAB-STOR

Holds 12 Tab Card boxes — a low cost orderly storage system.

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DOLIN METAL PROD. INC.

315 Lexington Ave. B'klyn 16, N. Y.

The Victor Safe & Equipment Co., Inc., 315 Park Ave South, New York 10. (FC;VC)
Virginia Metal Products, Inc., Orange, Va. (SH)
VISIrecord, Inc., Copiague, L. I., N. Y. (VV-Including portable units)
Visi-Shelf File, Inc., 225 Broadway, New York 7. (SH)
Vue-Fax Corp., 655 Main St., Westbury, N. Y. (VV)
Wassell Organization, Inc., Sylvan Ave., Westport, Conn. (RM;VC; VV)
Watson Mfg. Co., Inc., 63 Taylor St., Jamestown, N. Y. (FC;SH; VC)
The Weis Mfg. Co., Box 600, Monroe, Mich. (TC)
Western Mfg. Co., 536 N. Highland Ave., Auroro, Ill. (FC)
Wheeldex & Simpla Products, Inc., 1000 N. Division St., Peekskill, N. Y. (MI-Portable card index file;RM)
Wilson Jones Co., 209 S. Jefferson St., Chicago 6. (TC;VB)
The Wright Line, Inc., 160 Gold Star Blvd., Worcester 6, Mass. (RM)
Yawman & Erbe Mfg. Co., 1099 Jay St., Rochester 3, N. Y. (FC;MI; Side-filing units;TC;VC;VV)
York Safe & Lock, Mulberry Rd., Canton 2, Ohio. (SH)
Zephyr American Corp., 95 Morton St., New York 14. (RM)

Manufacturers of Safes and Insulated Storage Equipment

The following list covers the major manufacturers of safes and record protection equipment. The types of equipment offered by each company are indicated by the following codes:

F—Insulated filing cabinet.
S—Safes.
FR—Fire-resistive.
PU—"Point of use" record protection equipment, including ledger safes, insulated posting desks, and similar equipment.
MI—Miscellaneous.
FRE—Fire-resistive equipment.
FFR—Fire-resistive filing cabinets
SFR—Fire-resistive safes

Acme Visible Records, Inc., Crozet, Va. (FFR)
Acorn Products Co., 4605 W. 21st St., Chicago 50. (MI-Insulated letter files)
R. S. Allen Business Machines, Inc., 678 Front Ave. N.W., Grand Rapids 4, Mich. (FFR;FR)
Art Steel Co., Inc., 170 W. 233 St., New York 63. (SFR)
John D. Brush & Co., 545 West Ave., Rochester 11, N. Y. (SFR)
Bentson Mfg. Co., Aurora, Ill. (MI-Safe-desks and telephone cabinet-safes, fire-resistive)
Cole Steel Equipment Co., Inc., 415 Madison Ave., New York 17. (S)
Diebold, Inc., 2011 Mulberry Rd., Canton 2, Ohio. (FFR;PU;FRE)
Dolin Metal Products, Inc., 315 Lexington Ave., Brooklyn 16, N. Y. (PU)
Ever Safe Co., Div. of Schwab Safe Co., Inc., Main & Earl Ave., Lafayette, Ind. (FFR)
The General Fireproofing Co., 413 Dennick Ave., Youngstown 1, Ohio. (FFR)
The Globe-Wernicke Co., Norwood, Cincinnati 12. (FFR;PU)
Herring-Hall-Marvin Safe Co., Subsidiary of Diebold, Inc., 1550 Grand Blvd., Hamilton, Ohio. (FFR;PU;SFR;FRE)
Invincible Metal Furniture Co., Manitowoc, Wis. (MI-Concealed Safe Unit placed in cabinets)
LeFebure Corp., 716 Oakland Rd., N.E., Cedar Rapids, Iowa. (PU)
Meilink Steel Safe Co., 1672 Oakwood Ave., Toledo 6, Ohio. (FFR; PU;FRE)
Midwestern Mfg. Corp., 419-20 Lemcke Bldg., Indianapolis 4, Ind. (FFR;PU;FRE)
The Mosler Safe Co., 320 Fifth Ave., New York 1. (FFR;FRE)
Protectall Safe Corp., Hamilton, Ohio. (FRE)
Remington Rand, Div. of Sperry Rand Corp., 315 Park Ave. South New York 10. (FFR;PU;FRE)
The Schwab Safe Co., Lafayette, Ind. (PU;FRE)
The Shaw-Walker Co., Muskegon, Mich. (FFR;PU;FRE)
The Victor Safe & Equipment Co., Inc., Remington Rand Div. of Sperry Rand, 315 Park Ave. South New York 10. (FFR;PU;FRE)
Vue-Fax Corp., 655 Main St., Westbury, N. Y. (MI-Insulated vertical-visible equipment)
VISIrecord, Inc., Copiague, L. I., N. Y. (FFR;PU)
Watson Mfg. Co., Inc., 63 Taylor St., Jamestown, N. Y. (PU)
York Safe & Lock, Subsidiary of Diebold, Inc., Canton 2, Ohio.

Equipment for Integrated Data Processing

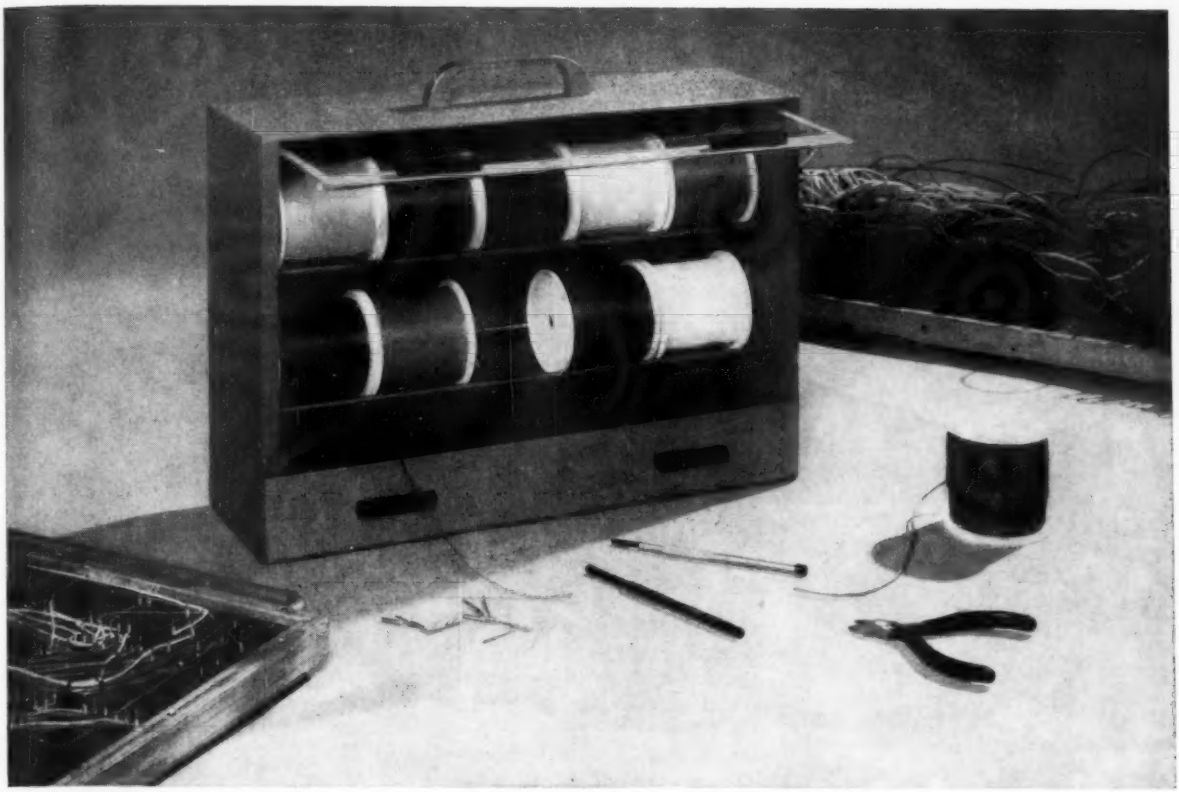
In essence, the basic concept behind integrated data processing is simply the avoidance of repetition of work. If data is recorded once, in whatever form it may be, there should be no second manual recording of this information regardless of where it is used. Another way to phrase this may be "never repeat."

This premise is, of course, not new. It is in use today as it has been in offices for many years, even in those not equipped with high-speed electronic computers. The typist using a carbon paper to make a second copy of the letter she is typing is making use of this principle. "One-writing" payroll systems in which forms are aligned in such a way that repetitive information is written just once, although it appears on several sheets, is another example. An essential part of one-writing systems is, of course, the design of such forms, and even in the more complex automated systems — those involving electronic computers—the design of forms still plays a very important role in the functioning of an integrated data processing system.

Another illustration of the "don't repeat" principle in the duplicating equipment of the "systems" type in which certain sections of the material can be selected to suit the forms being used.

The above illustrations show one obvious means of avoiding repetition by recording the original data in all the places it is required at the time of its first recording. This simple idea is also the basis of the second means of accomplishing the avoidance of manual reptition of material—the development of a system in which the information will automatically repeat itself.

The idea of a machine or system of machines which automatically transfers data repeatedly is, of course, newer than the simple work-saving principles described above, but while the machinery involved is



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infinitely more complex than carbon paper or sets of carbon-interweaved forms, the principle is equally simple.

A thing which is new, especially one which is accompanied by multisyllable words, is very often surrounded by an air of great mystery which, in turn, creates misunderstanding. The hardware of integrated data processing systems is not composed of simple machines. But without taking away from the great technological and scientific advances represented by punched card and punched tape units, computers and other such integrated data processing equipment, the fact remains that the idea of automation is basically a simple one, so simple that it often gives rise mistakenly to the idea that it will be a cure-all for all business problems as well as changing completely the office as we know it today.

Revision of principle

The successful use of integrated data processing equipment necessitates a revision of thinking and office workflow systems based on the principles of IDP, rather than on the use of the hardware. It is the system which is the most important thing, not the machines, so that it is possible for a very small office to be as fully "automated," in terms of its needs, as a large one using an electronic computer if its work system is based on the same idea of capturing information at the source in some form that will allow that information to flow through the office without ever being manually recopied. When the method of avoiding repetition involves use of a machine that will allow information to automatically repeat itself, it is necessary that the machine "read" instructions, and on a large scale, necessary that there be some means of having machines transmit the information to other machines.

A "machine language" is the answer to this problem.

The first integrated data processing equipment utilized a machine language already in existence, the punched paper tape. These tapes have codes which correspond to letters and numerals, and these had already been satisfactorily used with wire transmission equipment such as teletypewriters.

Underwood's Data-Flow system has electric typewriters, tape readers, tape punches, adding mechanisms, and programming devices.

A typist working with a punched tape system types the material in the conventional manner, but as she does so, the machine she is using produces a punched tape as a by-product of her work. From this point on the tape is fed into various machines which "read" it and translate it into electrical impulses. Depending on the complexity or nature of the system, the path of the signals may produce other tapes which may eventually be translated back again into their original form of letters and numbers. It is necessary in a punched paper tape system to introduce instructions as to what part of the data on the tape should be reproduced and what part should be skipped. It is also necessary to have some form of control over the machines so that they may be stopped for additional information to be inserted at the proper time in the work program.

An automatic typewriter is very similar to a tape-controlled machine in this respect.

In a theoretically completely integrated system, human activity would only be necessary to enter new data and start the operation of the work cycle. Each machine would be provided with instructions to proceed automatically as long as it is repeating or acting on previously inserted data. It would stop for changes or insertions and again, in a theoretical situation, this insertion would be a manual one only if it were new to the system. Otherwise, the additional material could be transferred by another machine through a machine language medium. The output of one machine would be fed directly to the next machine in the cycle without human intervention. All machines would be set up to complete all the work in a unified system.

The cost and limitations of the machines themselves make this theoretical fully integrated data processing system remain, for the most part, theoretical at the present time.

Systems design

The most important factor in setting up an integrated data processing system is the design of the system. Before the installation of any IDP equipment, planning of the highest order must be done. The time needed for such planning and systems design may seem excessive but if the time expended results in the creation of a system which makes the greatest use of the potentialities of the equipment and comes closest to realizing the theoretical situation, then it is the cheapest part of the whole effort.

In the initial installations of IDP systems, firms had no important experience on which to rely and many costly mistakes were made. There is still no fool-proof method for successful planning and installation of an integrated data processing sys-

tem, but the one thing which has become clear as a result of these earlier efforts is that without proper planning there can be no substantial advantages gained from such a system.

A large part of the disappointment of the integrated data processing systems which involved computers was caused by the fact that they did not accrue the substantial conventional office work savings that were expected. Increased use of IDP systems makes it clearer just what these machines can and cannot do, and just where their value to a firm lies. Some experts feel that the biggest benefits from an automated system will not come from labor-savings but from the system's ability to provide better, more accurate, and more timely information about the operation of a business.

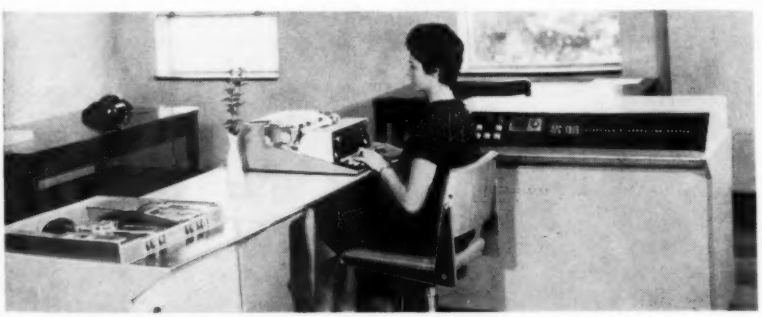
Another factor to be realized is that the newness of the field itself creates certain problems aside from the lack of a great backlog of experience. Different models are constantly appearing on the market and the field is so relatively young that the exact direction in which it is heading, the machines which may eventually emerge in two years or ten years, cannot now be clearly envisioned.

The Royal Precision Corporation, which is jointly owned by Royal-McBee Corporation and General Precision Equipment Corporation, recently announced a new, fully transistorized general purpose digital computer system which can serve both scientific and business data processing needs. The new system is called the RPC-4000 and is said to be the first transistorized computer in its general price range to offer in one system complete flexibility for handling both business and engineering applications. The RPC-4000 will be available at a monthly rental of $1,750, or a total sales price of $87,500, with first deliveries scheduled for next July. The RPC-4000 has a memory capacity of 8,008 words, which can be searched for full or partial words through a special masking feature at a sustained rate of nearly 200,000 words a minute. Three thousand words of memory can be scanned in less than one second for full or partial equality or for superiority to a key word. This is accomplished, the company stated, by means of a new concept in magnetic drum memory design. The computing system is capable of operating on nine-digit numbers at rates up to 240,000 operations per minute.

According to L. Stanley Crandall, Royal Precision president, the RPC-4000, as a general purpose computer, is applicable to both engineering and business data processing problems such as inventory control, payroll, and sales analysis. As many as 17 input-output devices —or 60 with minor modifications— may be connected on-line with the basic system.

Standard input-output equipment for the RPC-4000 is a tape typewriter system, complete with typewriter, desk and tape punch-read console, all specially designed as a unit.

Basic reader speed is 60 characters per second; basic punch speed is 30 characters per second. A reversible photoelectric reader which reads punch-paper tape at 500 characters per second and a high speed punch—300 characters per second—are available as optional accessories for system expansion. Peripheral equipment to be made available in 1961 includes a magnetic tape drum and line printer.



The Royal Precision Corporation stresses flexibility with its new RPC-4000 general purpose digital computer.

The Ferranti High Speed Electric Paper Tape Reader Type TR 7.

Punched tape is just one of the common language media interconnecting office machines. Punched card systems are another method of integrated data processing and other media have been developed or are in the process of being developed. Magnetic tape is one which has been used extensively because of its enormous operating speed, great compactness and unlimited capacity for re-use. Because of its cost and difficulties in handling it in some respects, it is used mainly as an internal language within electronic computer systems. The magnetic principle, however, can be used in other physical forms, and the field of banking is particularly interested in magnetic media for its data processing activities. It is reasonable to expect that in the very near future, documents, which are printed with magnetic ink and which are run through machines which can scan the printed figures photoelectrically and then transmit this data onto punched cards or tape for further processing, will become fairly common. One of the biggest problems at the moment is the necessity of developing a typeface or font which will enable the machine to distinguish easily between different letters and numbers which are similar in appearance — eight and three, for instance.

Another new idea is the use of a machine to read perforated numerals of the kind that may be punched into a document by a conventional perforating machine. This method is promising because the perforating

equipment is a standard item and the marks it makes may be read either by eye or by a sensing machine that is also relatively simple in design.

Another outstanding refinement of operation is the development of "pseudo codes" for computers, written in simple English words, which the computer itself then translates into a whole routine of instructions. This not only simplifies the programming operations of the computer, but also will help relieve the problems caused by a shortage of personnel qualified to translate the flow chart (the descriptive diagram of the steps to be followed by the computer) into the language of the machine.

As was stated before, the whole field of integrated data processing equipment is in a state of flux. And almost every week brings more fresh news of developments in machines geared to automation. A number of small, relatively inexpensive, electronic systems have appeared which make possible the use of high-speed processing in firms which found the larger pieces of equipment too costly.

Other developments have come about in auxiliary input and output machines designed to keep up with the speed of the electronic computer in capturing the output data. High-speed printers have been developed, one of which makes use of the xerographic process and prints nearly 5,000 lines a minute. It is thought, however, that possible limitations resulting from incredible speeds will force discovery of other high-speed output methods.

Stromberg Time's TRANSACTER gathers data from remote points and delivers it to data-processing center.

Another developing phase is that of building IDP systems on a unit basis in which the components may be assembled as needed and may be installed remotely from the central data processing unit. Such an arrangement, of course, provides greater flexibility and increases the amount of integration possible with one installation.

In another sense, aside from the technical accomplishments being made in the field, significant progress is being seen in the knowledge and experience being gathered from the everyday use of the machines themselves. The more we learn about the machines, their capabilities and their uses, the greater their importance and impact on the business world. This accumulation of greater practical experience will lead, as it is now doing, to the wider use of integrated data processing systems.

The work load of the office is constantly increasing and although IDP systems, when used with an electronic computer, have immense potential for research and solution of management's problems, at the present time the main concern and application is in keeping up with the volume of paperwork that exists now in offices.

In the following pages there has been an attempt to list manufacturers of equipment which reads, processes, transmits, or otherwise handles data in some machine language form. It includes equipment which simply enters data into a common language, equipment used to convert data from one language into another, processing equipment, transmitting equipment, and equipment used to "read out" the results

The Burroughs Visible Record Computer for the Banking industry uses principles of Magnetic Ink Character Recognition.

into a legible form. In addition, there is also a list of some accessory equipment which is important as it helps facilitate the actual operation of an integrated data processing system.

The Manufacturers

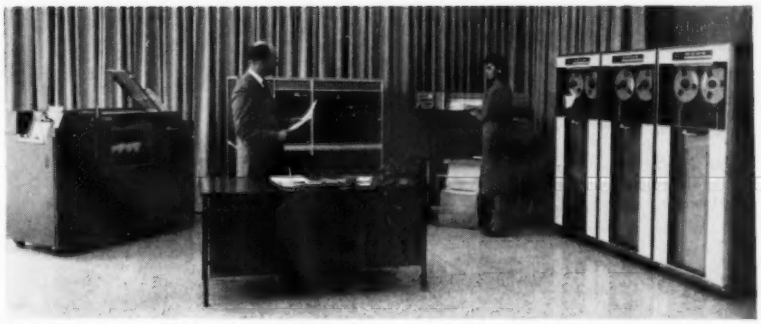
Because of its great diversity, IDP equipment cannot be satisfactorily categorized in the manner used in manufacturers' lists elsewhere in this department. An attempt is made below to describe briefly the general types of products offered by various companies. It should give the reader a reasonably good idea of the types of equipment now available for IDP.

Addressograph-Multigraph Corp., 1200 Babbitt Rd., Cleveland 17. Company has manufactured Graphotypes operated by punched paper tape. Certain of the company's addressing equipment have features such as punches which ally it to punched card operations. Also, the Multilith line of offset duplication equipment uses offset masters which can reproduce themselves and which can be prepared by automatic inputs.

Airborne Instruments Laboratory, Inc., Modac Div., Old Country Rd., Mineola, N. Y. Firm has produced line of Modac electronic data processing systems in the $100,000 price range, including computors and card-to-tape converters.

Alwac Corp., 13040 S. Cerise Ave., Hawthorne, Calif. Company was previously known as Logistics Research, Inc., and offers a general purpose digital electronic computer, the Alwac III E., in $100,000 price range.

Graphotype addressing unit operates on scanner and punched-tape combination; it is from Addressograph-Multigraph Corp.



IBM's new "1401" data processing system. The all-transistorized equipment provides "high-powered data processing within a price range previously limited to conventional punched card accounting machines," company says. Unit reads 800 cards a minute.

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American Telephone and Telegraph Co., 195 Broadway, New York 7. Data-Phone is a Bell System service which makes it possible to transmit data or text in any machine language over regular telephone lines at speeds currently up to the equivalent of 800 words per minute.

Ampex Corp., Instrumentation Division, 934 Charter St., Redwood City, Calif. Firm manufactures magnetic tape transport equipment, including heads and read/write/translator electronics for use as input-output devices in electronic computers and other specialized digital systems. Firm also manufactures and markets computer tape.

Anelex Corp., 150 Causeway St., Boston 14. Company produces high-speed printers for high-speed printing with inputs from punched tape, punched cards, magnetic tape, or magnetic drums. Also, Anelex Print Station, and a data printer.

Bell Telephone Laboratories, 463 West St., New York 14. Research and development work for the Bell System. (See listing under American Telephone & Telegraph Co.)

Bendix Computer Div., Bendix Aviation Corp., 5630 Arbor Vitae St., Los Angeles 45. Firm has manufactured G-15 general purpose digital computer in the $50,000 class, designed for engineering and scientific work; also has business units using punched card and/or punched tape input. Alpha-numeric paper tape converter may be used for integration with systems using 5-, 6-, 7- and 8-level codes.

Burroughs Corp., 6071 Second Avenue, Detroit 32. Burroughs Corp. offers three electronic digital computer systems: desk-size E101, medium-scale 205, and intermediate-scale 220. The E101, which features simple, external pinboard programming, stores data on a 220-word-capacity magnetic drum memory. Keyboard input may be augmented by 80-column cards and standard, commercial 5- and 8-channel, paper tape. Output is to semi-ganged printer, with optional facility for paper tape. Basic repertoire consists of 29 single-address commands.

The Burroughs 205 is a medium-scale electronic data processing system. Input is through keyboard, punched cards or perforated paper tape. Output is to electric typewriter, punched card, paper tape or line printer. The general-purpose, decimal-digit 205 stores data and instructions on a 4,800-word magnetic drum. Applications for the 205 cover the complete range of commercial, engineering, and scientific computation problems. Purchase price for an average 205 system is around $250,000.

The Burroughs 220 is an integrated, general-purpose electronic data processing system featuring a basic magnetic core memory of 2,000 words, which may be expanded to a maximum 10,000 words in increments of 1,000.

The Burroughs F5212 Dual Printer Sensimatic is a new machine specifically designed for banks that allows simultaneous and original printing on a combined ledger and statement form with conventional bookkeeping equipment.

In the Burroughs MICR (Magnetic Ink Character Recognition) automation program for banks is the Burroughs Magnetic Character Sorter, which sorts checks at rates of over 1,500 items per minute; and an electronic bank bookkeeping machine with automatic statement processing. Upon command from the bookkeeping machine, the selector electronically searches out any desired statement from a stack of statement forms placed in the selector feeding tray and inserts it into the carriage of the bookkeeping machine without human assistance. On completion of posting, it returns the form to a stacker in proper sequence.

A new desk-model bookkeeping machine, style P612, has recently been placed on the market by Burroughs. The machine is designed to put highly automatic mechanized accounting within the reach of small business. Also, Burroughs Sensimatic Typing Data processing equipment.

Clary Corp., 408 Junipero St., San Gabriel, Calif. Firm has developed an electronic scanning printer which works directly from logical levels and has a keyboard for supplemental data entry. Called the Clary Model 1961, the scanning printer has 12-digit decoding and printing capacity for electronically controlled data from both decimal and binary-coded decimal sources.

Copy-Craft, Inc., 105 Chambers St., New York 7. The Ormig Selective Data Printer produces from a given master all information on that master or selected data condensed on single item tickets. The new Ormig Electronic performs the same functions as the Selective Data Printer, and allows the selection electronically from a master of any number of lines in any combination.

Cummins-Chicago Corp., 4740 N. Ravenswood, Chicago 40. Company has manufactured Perf-O-Data equipment which encodes documents by perforation; the Perf-O-Reader (character-scanning unit) scans the perforated characters by means of a photoelectric reading device. Other equipment includes an auxiliary keyboard which provides for manual entry of variable information or corrections.

"Dial Data" closed-circuit television system is offered by Thompson Ramo Wooldridge's Dage Television division. Heart of system is "data console" equipped with TV camera. Console also contains rack holding 25 slide frames of records, files, information.

Dage Television Div., Thompson Ramo Wooldridge, Inc., Michigan City, Indiana. Firm has made line of closed circuit television equipment which is used in some automatic systems to speed exchange of visual information as in verifying signatures on documents. New Dial-Data system provides instantaneous access to visual data. Heart of system is a "data console" equipped with a special closed-circuit TV camera. Console contains a rack holding 25 slide frames of records, files, information, sheets, schedules or other constantly changing data. Automatic dial equipment determines which frame is placed before the camera, and thus, what information is sent over the system. Individual dials at each monitor permit the user to dial for visual information as easily as making a telephone call. "Dial-Data" system installations begin at $15,500.

Dashew Business Machines, Inc., 5996 Smiley Drive, Culver City, Calif. The firm has manufactured equipment providing original entry of data into automatic systems. Dashaplate, a basic source of data, is an embossed plate of metal or plastic, carrying basic information. Plates can be created at rate of 6,000 an hour by Databossers (controlled by punched tapes or cards), or manually on Datatypers.

Datamatic Corp., 151 Needham St., Newton Highlands 51, Mass. See listing under Minneapolis Honeywell.

Dennison Mfg. Co., 300 Howard St., Framingham, Mass. Firm has Print-Punch marking machines which are used to prepare merchandise tags for subsequent automatic processing. The machines punch basic merchandise data in four- or five-channel code, and simultaneously print information (such as size, price, style number, etc.) that can be read easily by customer and sales clerk. Printing and punching rate is 200 stubs per minute.

Allen B. Du Mont Laboratories, Inc., 750 Bloomfield Ave., Clifton, N. J. Although not IDP equipment, the Du Mont line of closed circuit television has applications in data handling systems since it can provide instantaneous visual transmission of information. The line includes a variety of components designed to be integrated interchangeably into the system.

Digitronics Corp., Albertson Ave., Albertson, Long Island, N. Y. Firm makes Dyker Auxiliary Tape Processing Equipment for off-line testing, editing, copying, interrogation, and translation of magnetic films. Basic circuitry employed in equipment is based on solid state transistorized components. In order of increasing complexity, the Dykor modules build up to form: first, the tape testing device; second, the interrogation device; third, the copying device; fourth, the editing device; and fifth, the translation device. Cost of complete system is $56,500.

Dykor D10K Converter is magnetic tape to teletype converter. It translates and edits data from any computer wherein the code is 7-bit parallel and serial by character, to its corresponding form on standard teletype paper tape. Magnetic tape data is accepted by the D101 Converter. The conversion operation is manually initiated but proceeds automatically thereafter until the end of the input tape data. Editing and format control is automatically assured by a plugboard which permits insertion of carriage returns, line feeds, etc., as well as skips, zero

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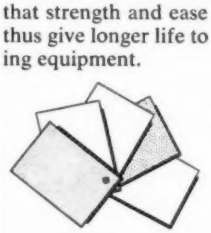

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Since the appearance of the first discussion on the subject of Automation in the Office in the August issue of 1952, OFFICE MANAGEMENT has published articles on Automation on a regular basis to keep the office abreast of everything new on this modern technique. Here are some typical ones:

JUNE 1959
New programming approaches continue to simplify computer applications
—Robert M. Smith
"Total systems" approach to integrated data processing pays off for Seagram
—Joseph C. Blunt

JULY 1959
Automation opens new horizons through new developments in first half of 1959
—Robert M. Smith
Automation will completely change office growth, work patterns, NOMA hears

AUGUST 1959
Automatic programming-what does it offer, how does it work?
—Robert M. Smith
Computer centers across nation continue to widen services to small business
—Gerald Cook

SEPTEMBER 1959
Automatic programming-what does it offer, how does it work?

OCTOBER 1959
"What's Ahead in Automation for the Nation's Smaller Offices?"
—Robert M. Smith

NOVEMBER, 1959
Visible Record Computer Adds "New Dimension" To Banking Automation.
AMA speakers report—Automation will raise Status of Office Manager

DECEMBER, 1959
AMA speakers report—Automation will raise Status of Office Manager

WHAT IS AUTOMATION IN THE OFFICE?

Automation in the office is the use of the rapidly multiplying new systems developments and facilities of electronics to synchronize the functions of separate units of equipment into an overall operation. Importantly, while it can and does employ the latest in electronic computers and other new devices, it does not necessarily call for costly or experimental types of machines and equipment. Equipment presently in use in every modern office in America can be geared in one way or another to Automation.
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suppression, column splits, and translation of characters based on memory position. Plugboard can be designed for the special requirements of the purchaser. Construction uses printed circuit plugboards; self-checking facilities are incorporated in the circuits. Control and front panel lights make possible rapid location of malfunction. General price range is from $60,000 to $70,000. Electric multipliers are designed to extend the utility of standard Addressograph-Multigraph business equipment by providing five electronically selected 6-digit multipliers to multiply an 8-digit multiplicand. Equipment automatically reads the multiplicand from the addressograph plate.

Eastman Kodak Co., 343 State St., Rochester 4, N. Y. Company has collaborated with Addressograph-Multigraph in special purpose electronic data processing systems for mailing operations. Inputs are from punched cards with conversion to magnetic tape and printing out of addresses at rates to 45,000 an hour. The Kodak Minicard System is an ultra high-speed information handling system which records documents, pictures, or other information photographically on tiny pieces of film about the size of a postage stamp. Through the use of electronic controls, the Minicard system can be utilized to retrieve any desired information by searching the Minicard film records automatically at speeds of up to 1,000 frames a minute. New system combines advantages of microfilm, punched cards, and digital computing techniques.

Also, a new portable Verifax book copying unit with "photographic mind" capable of reproducing any type of printed page. Also, new Ektalith Loader Processor.

Electronic Associates, Inc., Princeton Computation Center, Long Branch, N. J. Company has made analog computers, designed primarily for scientific and engineering work. The Dataplotter takes data from punched cards or punched paper tapes and plots this information in continuous-line graphs. In this manner, data from electronic computers are put into graphic form.

Electronic Corp. of America, 10 Potter St., Cambridge 42, Mass. This

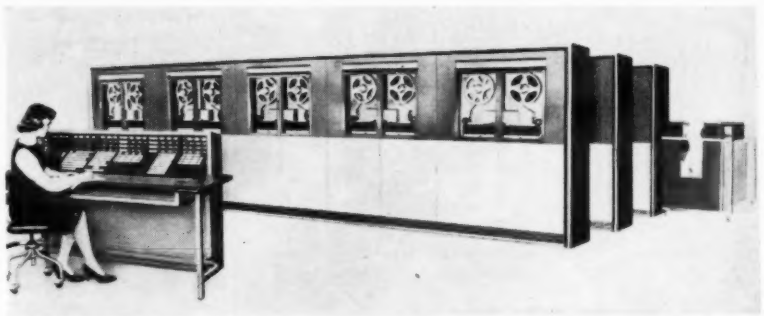
company has produced a series of Magnefiles, desk-size electronic units, for maintaining perpetual inventory information with various inputs. Computation facilities are also offered.

Farrington Mfg. Co., Industrial Center, Needham Heights, Mass. Company has general and special purpose high-speed optical-scanning (alpha-numeric readings) machine and associated identification and imprinting equipment for commercial data handling application.

Ferranti Electric, Inc., 30 Rockefeller Plaza, New York 20. Company has high speed tape readers with speeds of 200 and 400 characters a second which are used to convert codes in punched tape for input to computers and for similar uses. Tape reading and control are accomplished by photoelectric means. New high speed tape reader type TR7 is self-contained free standing unit capable of "reading" 5, 7, or 8 level tape at any speed up to 1,000 characters per second. A fast rewind is also provided giving less than 30 seconds rewind time for 1,200 feet of tape. Reader operates under either computer or manual control and will read character by character at high speed. Unit includes spooling, photosensing head, amplifiers, control circuits and power supplies, all fully transistorized. Special feature is built-in checking facility. Company has also manufactured two electronic computers (intended primarily for scientific work).

Fisher & Porter Co., Hatboro, Pa. Firm has made a line of data reduction equipment for industrial application, used for readout from manufacturing processes.

William A. Force Co., Inc., 220 Nichols Ave., Brooklyn 8, N. Y. Firm has made a numbering machine for electronic data processing which prints dots, dashes, or specially shaped figures instead of conventional numerals. Code markings, representing serial numbers, are printed on documents like checks, order forms, and other commercial papers processed by electronic scanning. A Convex 5-Channel Tape Coder is used on rotary printing presses to print dots corresponding to consecutive serial numbers, simulating 5-channel tape. The codes are intended for use as inputs to IDP systems.



RCA's "501" all-transistorized electronic data processing system. Equipment can include both on-line and off-line input and output devices in addition to computor with high-speed storage. Both on-demand and batch data processing set-ups are possible.

Friden, Inc., 2350 Washington Ave., San Leandro, Calif. Company manufactures Friden Flexowriter, an automatic writing machine. Latest models operate automatically from tape, edge-cards, or tab cards, and produce one or more by-product tapes or cause simultaneous punching of tab cards. New Model CTS Computyper is an automatic billing machine, tape-operated and tape-producing. Selectadata is a tape reader-selector-sorter which swiftly searches punched tape for predetermined data, then causes readout by Flexowriters or Computypers. Friden also makes Solenoid Input Adding Machine (Model ABS), Solenoid Input Printer (Model PRS), Adding Machine with Electrical Output (Model AAEO), Adding Machine with Electrical Output and Solenoid Input (Model AAEOS), Solenoid Input Add-Punch (Model APTS). The Friden Add-Punch produces punched tape and conventional listing simultaneously. Input is from 10-key adding machine keyboard.

General Dynamics, Stromberg-Carlson Division, San Diego 12, Calif. Firm has S-C 5000 Series of High-Speed Electronic Printers. S-C 5200 Registration Printers are specially designed for commercial applications requiring close tolerance registration of computer data on pre-printed forms. Prints up to 5,000 lines per minute.

General Electric Co., Computer Dept., Phoenix, Ariz. Company has recently developed the 312 Control System for data processing. Unit uses punched paper tape input and electric typewriter output.

Intelligent Machines Research Corp., Subsidiary of Farrington Manufacturing Co., 7019 Edsall Rd., Alexandria, Va. Firm has produced

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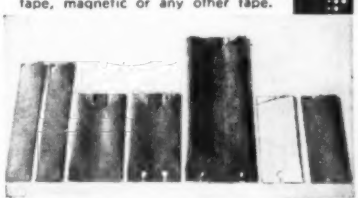

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equipment which reads printed characters, both alphabetic and numeric.

Haloid Xerox, Inc., 6 Haloid St., Rochester 3, N. Y. Company has manufactured "print-out" systems including the SC-5000 which can print at rate of 10,000 characters per second using the xerographic process, a dry, electrostatic means of forming image on-line signals from magnetic tape or from light transmissions. System is composed of the Charactron Beam Tube and the Haloid Company's Xerox Copyflo Printer. Also, Xerox Copyflo Continuous Printers which, from original documents of microfilm, produce at rate of 20 feet of print in less than 3 seconds. Company has also recently developed a high-intensity opaque projection system through a new application of xerography. Called PROXI, (Projection by Reflection Optics of Xerographic Images), the new system provides unusually brilliant, flicker-free displays of images produced by xerography from opaque subjects, microfilm or cathode ray tubes.

Intelex System Incorporated, 67 Broad St., New York 6. An Associate of ITT engaged in providing systems for the electronic control of repetitive clerical processes and supplying input and output equipment for data processing systems such as high speed teleprinters, tape punches, electromechanical and photoelectric tape readers. The new light-weight Creed Model Seventy-five Teleprinter operates at 100 words per minute. It is generally used as an input and output device for integrated data processing systems.

Creed Model 3000 Punch is an ultra high-speed paper punch for direct recording of five to eight tracks of out-put computer digital information at speeds of up to 300 characters per second – 3,000 words per minute. The punch operates on a multiwire start-stop basis incorporating revertive signalling arrangement for input control.

International Business Machines Corp., Data Processing Division, 112 East Post Road, White Plains, N. Y. Firm produces a series of data processing systems in various capacities and sizes including, Small Data Processing Systems: IBM 604 Electronic Calculating Punch, electronic computer for general-purpose computation. Monthly rental, $550 to $735. Selling price, $25,900 to $34,000. IBM 607 Electronic Calculator, electronic computer for general purpose computation; $800-$960 and up, monthly rental price; $37,500-$46,500 and up, selling price. IBM 610 Automatic Decimal Point Computer, self-contained mobile computer designed for programming ease; $1,150 monthly rental; $55,000, selling price. Medium sized Data Processing Systems: IBM RAMAC 305 (random access method of accounting and control) is system built around a disc memory unit which consists of 50 magnetic metal discs.

IBM 650 Data Processing System, for general-purpose computation, uses punched card input and output; additional units can be incorporated to provide magnetic tape input and output, printer output, paper tape input, magnetic core storage, and disc storage with random access and direct interrogation. Monthly rental is $3,750 and up. Selling price is $182,400 and up.

IBM 704 Data Processing System, large scale system, is composed of interconnected units, and designed primarily for scientific computation. Heart of system is high-speed magnetic core storage. Monthly rental is $44,000 and up. Selling price is $1,994,000 and up. IBM 705 Data Processing System is composed of interconnected units designed primarily for business calculations with 20,000 positions in magnetic core "memory." Magnetic drums and magnetic tapes are used for additional storage. Monthly rental for an average system is $35,000 and up. Selling price for an average system is $1,713,000 and up.

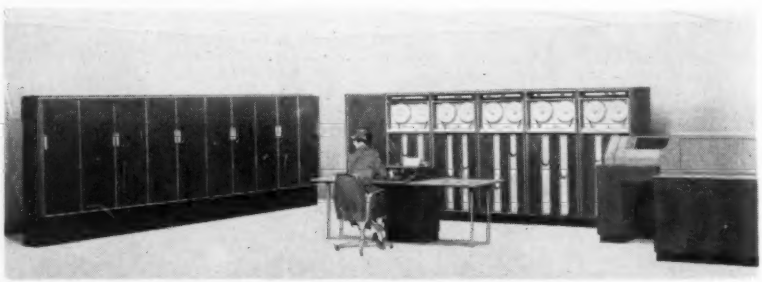
IBM 705-III Data Processing System is similar to earlier 705 systems but includes ultra high-speed tape unit, IBM 729 Model 3, which can write at a rate of 62,500 characters per second, automatically checking validity and readibility.

IBM 7070 Data Processing System is fully-transistorized high-speed data processing system utilizing modular, or "building-block" construction. The 7070 ranges in capability between medium and large-scale systems, depending on the number and types of units included. System is used for business and scientific problems.

IBM Series 1200 Character Sensing Equipment is new electronic system for the automatic handling of bank checks. Equipment makes use of an arabic character "common language" which can be read by both men and machines. These characters, representing amount, bank number, and other essential data, are imprinted on each check in magnetic ink. Series 1200 equipment reads this information from each check, proves and accumulates totals for all checks being processed, sorts the checks into desired sequence, and posts data directly into an IBM data processing system for a completely automatic check processing operation. System consists of four units: utility inscriber, proof inscriber, sorter-reader, and a control unit.

IBM 740 Cathode Ray Tube Recorder is an electronic output device which provides an output for the recording of data points on the faces of a pair of television-like tubes at the rate of 8,000 per second. Monthly rental is $2,850. Selling price is $112,000.

IBM Typewriter Card Punch (Types 824 and 826) prepares punched cards for accounting use



The Honeywell 800 is an expandable, medium-scale, data processing system developed by Datamatic Div., Minneapolis-Honeywell.

as an automatic by-product of typewriting operations. Monthly rental ranges from $95 to $145. Selling price ranges from $3,700 to $7,400.

IBM 63 Card-Controlled Tape Punch is used to transmit data automatically by commercial wire services. The 63 reads alphabetical and numerical information in IBM punched cards and perforates five-channel telegraphic tape with data. Monthly rental, $75. Selling price, $3,600.

IBM 46 Tape-to-Card Punch reads alphabetic or numerical information from a punched paper tape and converts it to IBM punched cards. Monthly rental for Model 1 is $140; for Model 2, $135. Selling price for 1 is $6,300; for Model 2, $6,050.

International Standard Trading Corp., 22 Thames St., New York. Firm has made a wide range of communications equipment and is an affiliate of the International Telephone & Telegraph Corp. Included are a variety of typewriter models and related equipment for many IDP functions.

International Telephone & Telegraph Corp., 67 Broad St., New York. Firm has communications facilities; also, an automatic system for processing bank checks, performing deposit accounting, and related reporting and analysis functions. System will permit rapid electronic and mechanical processing of all checks and documents regardless of type, shape, or size.

The Jacobs Instrument Co., Bethesda 14, Md. Firm has made electronic digital computing equipment.

A. Kimball Co., 444 Park Ave. South, New York. Company manufactures the "75" Punch Print Machine for encoding as many as 29 columns of punched and printed data into tickets and tags to serve as automatic input for punched cards and punched paper tape, and as input for integrated data processing systems. Kimball Portable Punch is slide-set and is used for encoding 12 additional columns of variable data in the Kimball Punch Print Ticket. Tag Reader Model KRB converts print-punch tickets at the rate of 100 per minute to standard size tabulating cards for further processing.

Kleinschmidt Laboratories, Inc., Div. of Smith-Corona Marchant, Lake Cook Road, Deerfield, Ill. The company produces a line of teletypewriting equipment for use in communications. The TT-195 High Speed Typing Reperforator punches and prints on paper tape at the rate of 750 words per minute, or 75 characters per second. It is used for receiving coded communications. The firm's line includes teleprinters, transmitting units, typing perforators, and accessory switching and selecting equipment.

The Univac Solid State Electronic Data Processing System by Remington Rand Division of Sperry Rand Corp., is available in 80 and 90 column equipment. Computer employs Ferractors.

Laboratory for Electronics, Inc., Computer Products Div., 1079 Commonwealth Ave., Boston 15. Company's RASTAC system may operate as independent data storage and access device or in conjunction with most standard general-purpose digital computers. It provides mass data storage with minimum random access time, operating independently. In conjunction with general purpose digital computer, it facilitates processing of commercial or scientific data on an in-line basis. It eliminates need for presorting of input data. System consists of from one to thirty-three high-density magnetic file drums, and two cabinets of control and power supplies. Heart of system is HD Magnetic File Drum. Also, SM Generator and Viewer which converts coded data to a visual message.

Librascope, Inc., 1607 Flower St., Glendale 1, Calif. Company has manufactured a small computer.

Litton Industries, 336 N. Foothill Road, Beverly Hills, Calif. This company has made small electronic calculators and other equipment.

Minneapolis-Honeywell Regulator Co., Datamatic Division, 151 Needham St., Newton Highlands 61, Mass. The Honeywell 800 is a medium-scale (expandable to larger scale) data processing system, consisting basically of a central processor, console five magnetic tape units, a printer, and a card reader. The all-transistorized 800 is a compact, versatile, and competitively priced system which processes a number of jobs simultaneously—each independently programmed and automatically controlled. System accommodates all types of input equipment although major input medium is punched cards. Central Processor (heart of system), utilizes multifunction instructions and operates at a speed of 30,000 three-address operations per second. It is specifically designed to attain high speeds for sorting, merging, and file maintenance procedures. System features Orthotronic control, a method of automatic record protection. The system can carry simultaneously both data processing and scientific computation.

Monroe Calculating Machine Co., 555 Mitchell St., Orange, N. J. Synchro-Monroe President is data processing machine which simultaneously punches tape or cards as a by-product of regular accounting jobs such as payroll, accounts payable, accounts receivable, stock record or general ledger. Monrobot LX is desk-size, electronic computer designed primarily for billing applications; however, it may be programmed to perform other applications. Price is $9,650; equipment may be rented. Monroe Distributape System is electronic accounting system designed to speed the accumulation, distribution, and analysis of data for retail stores. Synchro-Monroe Tabulator is low-cost machine for listing and adding numerical information from punched cards. Also, Synchro-Monroe adding machines which may be used as regular adding machines or data processing. With latter, they simultaneously and automatically punch amounts into paper tape. Synchro-Monroe direct-to-card adding machines transfer data directly to punched cards.

The National Cash Register Co., Main & K St., Dayton 9, Ohio. NCR offers IDP equipment of several types. New Class 31A is latest machine in NCR line of accounting equipment. It has electrically controlled mechanisms for determining and initiating the proper posting program for automatic machine operations. The 304 Data Processor is a medium size computer which includes such units as a universal converter, high-speed paper tape punch, high-speed printer, tape handlers and controllers, high-speed card reader, and high-speed paper tape recorder. The National Alpha-Numeric Card Punch Coupler links a National accounting or adding machine to a card punch machine, permitting alphabetical or numerical information to be automatically punched into cards. Post-Tronic equipment reads magnetic codes on paper documents, and is currently used largely for bank accounting functions. NCR has also released for sale a complete step-by-step system which automates the handling of checks in commercial banks.

Philco Corp., Government & Industrial Div., 4700 Wissahickon Ave., Philadelphia 44, Pa. The Philco Transac S-2000 is a large scale, ultra high-speed, all-transistor electronic data processing system which is suited to a long range of applications such as file maintenance, payroll, general and cost accounting, inventory control, premium billing, bank deposit bookkeeping, sales order billing, stock transfers, revenue accounting, market analysis and management reports, and a great variety of others. It is available in a wide variety of components and system designs, each component compatible with every other one for maximum speed and reliability. Approximate cost of Transac S-2000 is $1,500,000 and the rental charges are about $31,000 per month.

Potter Instrument Co., 115 Cutter Mill Road, Great Neck, N. Y. Firm has manufactured components for use in IDP systems, including high-speed printers taking inputs from magnetic tape, punched paper tape, and directly from computer systems; random access memory units; magnetic tape handling equipment; and punched tape readers.

Radio Corp. of America, Camden 2, New Jersey. Company has RCA 501 Electronic Data Processing System which is all-transistorized system that uses 8-channel paper tape and magnetic tape input, handling both alphabetic and numeric data. Basic components of system are computer, including its program control, operator's console, high-speed magnetic core memory, tape station selection and buffer unit, five high-speed magnetic tape stations, 1,000 character-per-second paper tape reader, monitor printer and paper tape punch, and high-speed, on-line printer.

William L. Raub, Inc., Silver Spring, Md. Company has punchwriter, which is compact electronic check-writing machine that simultaneously and in one action prepares bank money orders for input to tabulating equipment and for easy visual legibility. Unit prints amount of face of check in legible type and at the same time punches amount in standard tabulating code, thus enabling both machines and humans to read checks. Unit punch-prints single cards or manifold, five-part forms.

Remington Rand, Div. of Sperry Rand Corp., 315 Park Ave. S., New York 10. Remington Rand's new solid-state Univac Computer, the first magnetic amplifier, solid-state commercial data-processing system in actual operation, utilizes the latest developments in solid-state devices. Initial installation of the computer is at the Dresdner Bank in Hamburg, Germany, where it is handling the entire range of bank functions. The term "solid-state" refers to the fact that a variety of newer devices such as Ferractors, transistors and magnetic cores are used. Ferractors are no bigger in diameter than pencil-tip erasers. They perform accurately at temperatures ranging from 60 degrees below Fahrenheit up to 220 degrees above.

Univac II is a digital electronic computer with magnetic core storage. Accessory equipment includes Uniserve units, reading from and writing on metal magnetic tapes; high-speed printers; punched-card-to-magnetic tape and magnetic-tape-to-punched-card converters; Unitypers for typing directly on magnetic tape, and other equipment. Univac 120 and Univac 60 are smaller computers using punched card inputs, with particular adaptability to such operations as billing, production control, statistical work, scientific and engineering problems. Univac File-Computer, a medium size system, features random access and is intended for business operations of the "on-line" type. Company also has an electronic punched tape typewriter, a development of the common language concept, which automatically creates and reads paper tape that activates other equipment and wire communications systems. Company also manufactures an extensive line of punched card equipment, including punches, sorters, tabulators, and so on.

J. B. Rea Co., 1723 Cloverfield Blvd., Santa Monica, Calif. Company has made a line of Readix electronic computers in the small- to medium-size class, for general purpose use. Readix Dual Computer uses punched cards and magnetic tape, is a completely decimal computer, and is equipped to handle both research and development work and such business operations as payroll, sales analyses, labor distribution problems, and so on.

Royal Precision Corp., Westchester Ave., Port Chester, N. Y. See listing under Royal McBee.

Royal McBee Corp., Westchester Ave., Port Chester, N. Y. The Royal Precision LGP-30 electronic computer is a desk-sized, single-address, binary, stored program, fixed point, general purpose electronic digital computer. It features input-output via punched paper tape on integral electric typewriter or optional photo-electric tape reader and high-speed punch. It is a fully automatic computer in that its magnetic drum memory (4,096 words) allows loading of a complete program for directing machine operation on input data. Input-output is alpha-numeric and data and programs are introduced into the computer via-six-channel punched paper tape. Price is $49,500; it may be rented for $1,100 a month. Keysort Tabulating Punch is complete, punched card installation in one machine. General functions of equipment are to code data automatically and internally into Keysort cards as a by-product of normal control total listing, then automatically sense these values and accumulate, print (on tape) and

summary punch for any desired classification. It is being applied to such jobs as sales and order analysis, job costs, labor distribution, and payroll computation. Tabulating Punch is automated to the degree it automatically senses values coded into Keysort cards, and prints and totals these values. Price is $3,410; unit may be rented for $85 a month.

For information on Royal Precision's RPC-4000, fully transistorized, general purpose digital computer system, see page 125.

Scriptomatic, Inc., 300-16 N. 11th St., Philadelphia 7. Firm produces the 101-S addressing machine, which is equipped for reading either IBM or Remington Rand punched card fields. This means that the equipment can be programmed to selectively print, sort, or count, based on the same fields of holes used by the punched cards, ledger cards, and other types of card medium. Model 301 Scriptomatic is designed to print at ultra-high speeds from punched cards to standard mailing tapes. It prints at speeds of 30,000 to 40,000 addresses per hour depending upon secondary operations to be performed. A five-line address is printed from standard punched cards to a 7/8 inch wide tape. The Model 10 Scriptomatic is an intermediate machine between the larger, fully automatic models and the hand units; it is used for semi-automatic addressing. Price range is from $30 for small hand unit to $60,000.

Shepard Laboratories, Inc., Broad St., at Park Ave., Summit, N. J. Firm manufactures an electronic high-speed typer operating on the rotary principle, which has type-wheels that spin continuously and in unison at 600, 900, or 1200 rpm. There is no interference between reciprocating parts, according to the manufacturer, and typing rate is 600 to 900 lines per minute. The electronic typer is part of the company's electronic high-speed output system, which includes the Servo Transport Digital Tape Reader, Electronic Decoder, and Electronic Firing Group. The Electronic High-Speed Typers are in use as the output facility for RCA Bizmac Electronic Computers for the U.S. Navy, U.S. Air Force, and other large organizations. Electronic Typer with Firing Group is priced at $39,750; the Digital Tape reader is priced at $15,000. Rental

National Cash Register's Compu-Tronic business machine is said to combine in one unit the functions of the office calculator, adding machine, and accounting machine.

provisions are offered. The Shepard Electronic Mini-Typer produces "hard copy" at 10 lines per second, in 14 columns spaced 5 to the inch, with 64 characters.

Soroban Engineering, Inc., Box 1717, Melbourne, Fla. Company makes line of IDP components including tape readers for reading one or two perforated paper tapes. High-speed punches to perforate paper tapes with codes of 5, 6, 7, or 8 channels at rates to 300 code groups per second are also available. The firm produces verifying punches to verify data in punched paper tape; coding keyboard is used to compare re-entry of data with data in tape. Comparators to compare and detect discrepancies between two tapes intended to be identical are made by this company.

The Standard Register Co., Campbell & Albany Sts., Dayton 1, Ohio. Firm produces Stanomatic equipment which is designed to read magnetic codes on printed documents and convert information into a number of different common languages as required. Codes in 5, 6, 7, or 8 channels are pre-printed by special typewriters, registers, bookkeeping machines, imprinters, or at the factory when the forms are printed. Ink or carbon is read electronically in the machine. Outputs may be punched cards, magnetic tape, or punched paper tape, in codes with from 5 to 8 channels: unit may be used for utility billing, insurance company premium collections, chain store operations of inventory control, cash balances, processing retail credit sales by oil companies, and so on. Imprinting device called Selec-tronic Imprinter makes images using a ribbon device from an electrotype chase or graphotype plate on any continuous form. Also available is new forms separator called Form Flow Vertical Separator.

Stanford Research Institute, Menlo Park, Calif. Not a manufacturer, the Institute carries on research and development of high-speed electronic computing systems with special attention given to new components such as transistors, for use in small electronic systems.

Stewart-Warner Electronics, 1300 N. Kostner Ave., Chicago 51. Firm has produced the S-W Electronic Data Processing Unit, a small digital computer, desk-size, using standard electrical power sources. Equipment is designed for business applications such as sales analysis, inventory control, billing, order processing, etc. Product called Datafax also has been manufactured. It is facsimile equipment used for transmission of data over telephone circuits.

Stromberg-Carlson, Rochester 3, N. Y. *See listing under General Dynamics.*

Stromberg Time Corp., Main and Elm Sts., Thomaston, Conn. The Stromberg TRANSACTER (Transaction Transmitter) is an automatic all-purpose data-gathering system which serves as a rapid communi-

cation link between source of original entry at multiple, widely scattered transaction points and a central data-processing office. Among its typical applications are: job order recording, production control, inventory control, job costing, receipt and shipment, and on-line communication. Input media for system are prepunched cards or tags containing information obtained as a by-product of a preparatory function or from master files or decks of repetitive information.

Sylvania Electric Products, Inc., 1740 Broadway, New York 19. Firm has developed MOBIDIC computers, high-speed, completely transistorized digital computers of modular design. Computers have high-speed random-access memory unit which can operate over wide range of temperature variation.

Systematics, Inc., 10 E. 40th St., New York 6. Company manufactures Intercouplers – electronic equipment to inter-connect two or more business machines so that as one is operated in a normal manner, the other (s) are operated automatically. Equipment is compatible with IBM cards, Remington Rand cards, punched paper tape (all channels), edge punched cards. All models handle alpha-numeric informations. Models are available for input and output application. Present models inter-connect various machines made by National Cash Register, Friden, Remington Rand, Olivetti, IBM, Teletype, etc. Also available is a line of tape-to-card, card-to-tape and tape-to-tape converters as well as tab card readers. Prices range from $590 to $5,000, depending on combination. Firm also has Telepunch, equipment for integrating punched card accounting with wire communications systems.

Technitrol Engineering Co., 1952 E. Allegheny Ave., Philadelphia 34. Firm has produced custom-built digital data handling equipment, and components from which electronic computer systems can be assembled. Included are the basic units of the data handling system itself and the accessory units such as power supply, cabinets, etc.

Telecomputing Corp., 12838 Saticoy St., North Hollywood, Calif. Company has manufactured the Point O' Sale Recorder for reading pre-punched merchandise tags and producing punched paper tape carrying the information coded in the tags, plus additional data entered manually by keyboard as necessary. Tape is then available for automatic processing in other IDP equipment.

The Teleregister Corp., 445 Fairfield Ave., Stamford, Conn. Company has made specialized equipment, including passenger inventory control systems used by transportation companies to keep track of reservations made and remaining space. New reservations when made are automatically taken into account to keep space status up to date. Equipment is used in network systems, with information records maintained centrally.

Teletype Corp., 1400 Wrightwood Ave., Chicago 14. Firm has offered extensive line of communications equipment, such as page printers, tape perforators, transmitter distributors, typing perforators, message relay equipment, and other IDP facilities. Some page printers, transmitter distributors, and perforators operate on 6-unit code. Model 28 equipment is one of Teletype's newest contributions to the field of data communications. Units offer a wide choice of facilities for page printing, tape punching, and tape reading. They will operate at speeds ranging from 600 to 1200 characters per minute, depending upon the application used. Functional features including sequential or multiwire, input-output facilities, typebox printing, all-metal clutches and a built-in automatic function control device provide almost unlimited application facilities for handling data. This equipment is an integrated line designed on the modular principle, permitting a wide choice and ready interchange of components plus accommodations for expansion.

Typatape, Inc., 60 E. 42nd St., New York 17. Company has developed method of recording data in common language form by means of mechanical attachments to standard business machines. It prints a 4-channel numerical code on paper tape ¼-inch wide, as a by-product of normal machine use. Tape is fed into a photoelectric scanning converter.

Underwood Corp., 1 Park Ave., New York 16. Firm has produced Dataflo, an integrated processing system based on "building block" concept of merged electro-mechanical equipment which produces a continuous chain of business communications as a swift by-product of any original typewritten record. The Mastertyper unit, a standard electric typewriter with 4-bank keyboard and automatic finger-letter code, prepares original business documents such as invoices, waybills, etc. Data can be entered from punched paper tape as well as manually. The Elecom is a small digital electronic computer and accounting machine with a magnetic disc storage unit.

Victor Adding Machine Co., 3900 North Rockwell St., Chicago 18. The Electronic Section of the Victor Adding Machine Co. has developed a new high speed transistorized analysis system called the Victor Class 100 which allows businesses to meet the problem of computing detailed cost, and sales and inventory figures. Designed to speed up accounting, forecasting, and planning procedures, it relieves office personnel of computing, classifying, tabulating, and inter-classifying tasks. System is composed of a central program unit to which is connected a Digit-Matic printer. It processes raw data in random form from punched tape. Reading at a rate of 1,000 digits per second, the program reader "selects" and adds related figures, then transmits them electronically to the solenoid-activated Digit-Matic which accumulates them. Price is approximately $12,000 with Digit-Matic Printer. Victor Automatic Printing Calculator multiplies, divides, adds and subtracts through one control and ten numbered keys. It features automatic data over long lines. System is easily adapted to existing transmitting equipment used in chain and branch operations as well as to railroad, truck line, and air freight operations. Basic component of the system is a Digit-Matic solenoid-operated adding machine. Price range is from $425 to $1,100. Victor Data Punch is an integrated data processing device consisting of a Victor Custom Line full-keyboard adding machine

which activates a tape punch. Machine expedites accounting, forecasting, planning, sales analysis, and inventory by speeding-up the flow of vital facts and figures. Price range is from $1,325 to $2,000.

The Western Union Telegraph Co., 60 Hudson St., New York 13. Company has produced IDP facilities which include nationwide network of transmission lines, and wide range of communications devices, such as sending and receiving page teleprinters, tape perforators for punching paper tape, switching center equipment, automatic numbering machines, sorting equipment, and facsimile equipment. Type 19 sets have also been made by this firm to record information in punched tape and transmit it.

Accessories and Services

American Lithofold Corp., 53 W. Jackson Blvd., Chicago 4. Electronic check has prepunched tab card checks, on continuous marginal punched forms, with a side-stub perforation, mounted on Part 2 of the form, for use with tabulators, teletypers, and other equipment. Pocket Form for IDP tapes carries tapes in built-in pocket on back of form. Hand filing or fastening with clips or staples is unnecessary. Electronic Remitter incorporates the addressed envelope with account number, name, address, and amount of statement as an integral part of invoice or statement form. The return envelope stays with the statement until remitting customer makes payment.

Airmatic Systems Corp., 441 Market St., Saddle Brook, N. J. Automatic conveyor and pneumatic tube system for paper handling procedures.

Beemak Plastics, 7424 Santa Monica Blvd., Los Angeles 46, Calif. Firm makes tabulating card holders which may be installed on shelves, or in bins, boxes, and other containers.

Cycle Equipment Co., 17480 Shelburne Way, Los Gatos, Calif. Company has manufactured line of Universal Tape Minders and Standard Model Tape Minders for handling punched paper tape. The units are slave machines which start and stop automatically as tape is fed or as feeding ceases; designed for communications systems.

Dresser Products, Inc., P.O. Box 2035, Providence 5, R. I. Firm has punched tape accessories in the Tape-file line including envelopes, folders, winders, unwinders, files, searchers, reels, and boxes.

Forms, Inc., Willow Grove, Pa. Firm manufactures line-hole continuous business forms.

Mac Panel Company, High Point, North Carolina. Firm makes control panels and wires.

Monarch Metal Products, Inc., MacArthur Ave., New Windsor, New York. Firm manufactures data processing auxiliary equipment. It offers an extremely large variety of accessories and filing equipment for use with punched cards including "Filaway" cabinets and a complete line of items for the storage, handling and moving of magnetic tape.

Moore Business Forms, Inc., 900 Buffalo Ave., Niagara Falls, N. Y. Firm makes Model 425 imprinter-detacher for continuous forms or continuous tabulating cards. It will imprint, slit-off margins, detach forms to be imprinted, remove margins, detach and stack forms in numerical sequence; also offered is an extensive line of forms for use in automated data processing systems as well as research facilities for the development of individualized forms required in such systems. Also available are the Formaliner and Vertical Spacer, devices for handling forms. Decollators and stands, imprinter-detachers, deleaving attachments, and other equipment are also available.

Also, Speeditacher, new detacher which is portable for on-the-spot use.

The Shaw-Walker Co., Muskegon, Mich. Firm has produced complete line of holders for filing punched paper tapes and edge-punched cards for all systems applications. Also, File-Desk, which is a work station for Flexowriters.

Standard Instrument Corp., 657 Broadway, New York 12. Firm has Time Recorder Totalizer which continuously measures and records machine utilization.

Systems Sales Co., 13 Broad St., Binghamton, N. Y. Company has produced line of storage equipment, sorting stands and carts for use in handling and storing tabulating cards, and for storing single, double, and triple control panels. Also available are accessories for use with electronic computers.

Tab Products Co., 995 Market St., San Francisco 3. Company produces long line of automation accessory equipment. Equipment may be generally classified as follows: Tabulating card filing and storage: tabulating card handling: tabulating card reference: control panel storage: magnetic tape filing and storage: and "spacefinder" files.

Recently developed TAB equipment can, with relatively minor changes, be used in conjunction with punched card tabulating installations, card-activated computers, magnetic or paper tape computer systems, and analog computers.

Uarco, Inc., 7902 S. Ashland Ave., Chicago 20. Firm produces bursting machines which separate continuous tabulating cards. New Uarco Burster is equipped with high efficiency trimmer, and is capable of trimming up to 12 piles of fastened control punched forms.

Universal Business Machines, Inc., Columbia, S.C., P.O. Box 5183. Firm has Keytronic line of sorting machines.

VISIrecord, Inc., Copiague, L. I., N. Y. Firm offers a variety of equipment for storage of IDP common language media including filing cards of the "vertical-visible" type, with pockets for punched tape, or with cards themselves capable of being punched along an edge with IDP codes. Also offered are plastic tape panels, plastic channel cards, and VISIsleeves, which provide visible indexing for use in random sequence filing and finding of tape packs of variable lengths.

Wheeldex & Simpla Products, Inc., 40 Bank St., White Plains, N. Y. Firm manufactures mechanized rotary card files and offers equipment for housing IDP tapes for ready accessibility, either alone or in combination with related records. Simplawheel and Simplafind mechanized files may be used as the basic housing units. Simplawheel equipment is priced from $600 to $1,800; Simplafind equipment is priced from $3,000 to over $4,000. Wheeldex Portable Line consists of many smaller models carrying from 1,000 to 4,000 cards. Other Wheeldex models, either motorized or manual, contain from one to five wheels, and hold from 4,000 to 30,000 cards per cabinet.

Typewriters

According to history, the germ of typewriter genius first presented itself over two hundred years ago when Henry Mill, an English engineer, patented a writing machine which he said he "had brought to perfection at great paines and expense"; however, it was more than a century and a half later before the first practical typewriter was actually built. The evolution of the typewriter is stamped by many distinguished names — Burt, Progin, Thurber, Littledale, Leavitt, Beach, Fairbank, the blind Pierre Foucauld, Sholes, Glidden, and Soule are just a few.

And the most distinguished typist of all time is, of course, Don Marquis's "Archie," the *vers libre* bard whose creative soul had been reincarnated into the body of a cockroach. As a cockroach, Archie's only source of voice was the typewriter, and it was through the typewriter that he was able to describe great "Mehitabel," the *toujours gai* cat who has charmed millions.

The fundamental purpose of the typewriter is to enable the typist, or operator, to do more and better work with less effort in a given time than can be done with the pen, and the value of the typewriter is measured by the extent to which it increases speed and legibility in making records or preparing messages for delivery.

However, the typewriter of late has been doing some extraordinary things. In fact, due to certain new typewriter developments, we may very well be on the threshold of an office without typists. Because, according to recent reports from the electronics department of the Kyoto University in Japan, there has been developed a typewriter which can take dictation. The typewriter transforms sound vibrations into electric waves and instantly prints whatever is said in Roman letters!

Today, the typewriter not only continues to serve its basic function of printing neat clear copy, but has also become one of the most important parts of any highly automated office system.

It is used as a systems machine in accounting, a substitute machine for the expensive typesetting equipment used to prepare printed copy for magazines and books, and a "point of origin" machine for entering information into integrated data processing systems.

Numerous refinements and features have been added to the typewriter so that its traditional abilities and functions have been increased. Some of these refinements include horizontal and vertical halfspacing, simplified setting of margins and tabulation stops, the addition of special keys, and, of course, electrification of machines.

Several basic types of office typewriters have been on the market for quite some time. These include noiseless machines, machines using carbon ribbons to produce copy of exceptional clarity, long carriage machines intended for statistical work, and electric machines.

In addition to these, several semi-electric models are available. One type features an electric keyboard with manual carriage return while another has a manual keyboard with an electrified carriage return.

There are many other machines that have intriguing and practical modifications. One is designed to be used in the preparation of bar graphs and has keys with appropriate designs. Another has embossed codes resembling Braille for the use of the blind, and still another variety of the standard machine is one intended for the use of one-armed typists which eliminates two-hand steps such as typing single capitals.

Other variations have come about in the design of portable machines. An electric portable has been introduced — although it is not fully electrified as it does have a manual carriage return. Another portable features the cartridge approach in changing ribbons. The ribbon is encased in two plastic containers similar to small film magazines and with the use of these, ribbons can be changed without being touched by hand. Some standard machines also have this feature.

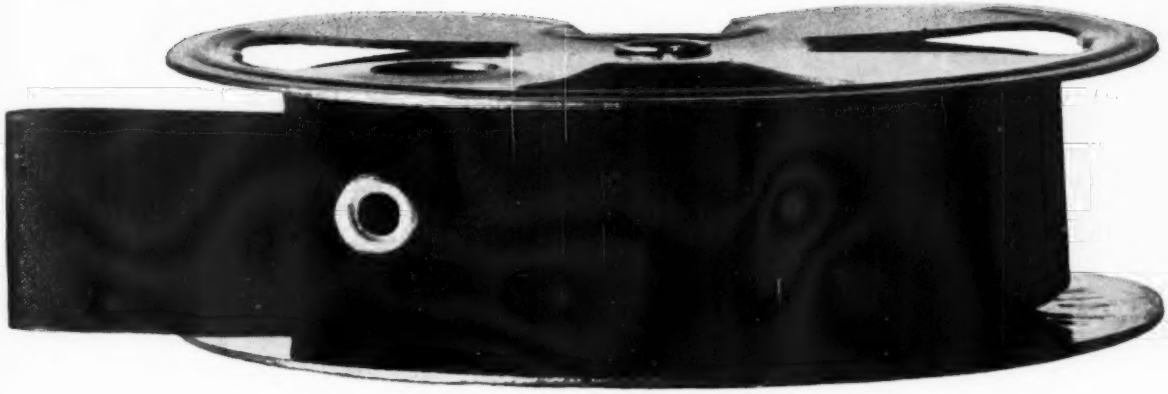
Interchangeable type is now available for some models. With this feature the operator can very easily change the keyboard to permit the printing of additional symbols and characters needed in specialized work.

One of the very significant advances which have come about is concerned with tabulation. There is now a feature on some machines which allows a typewriter's tabulating mechanism to sense metallic ink printed on business forms.

Pictured above is "Futura" typewriter, portable model by Royal McBee.

"Diaspron," above, is standard typewriter recently introduced by Olivetti.

Shown above is "Travel-Riter," recent portable model by Remington Rand.

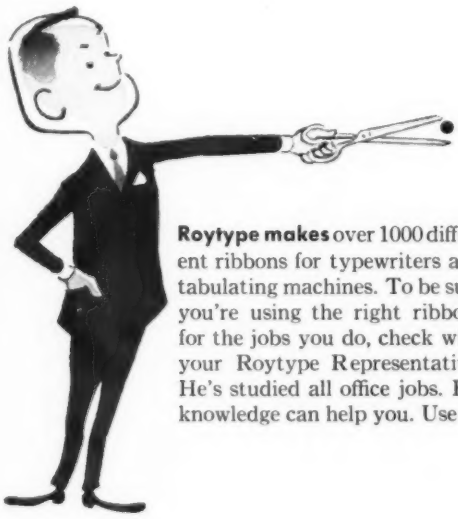


Roytype Park Avenue Silk Ribbon stays ink-full **LONGER...AND LONGER... AND LONGER...** costs much less in the long run.

You pay a little more for Roytype Park Avenue Silk Typewriter ribbon than you do for cotton ribbon. But you get a whole lot more. It keeps on typing nice and black for a much, much longer time. Long enough to save you plenty.

The fact is, this is the one perfectly balanced ribbon. It combines the best balance of strength and absorbency. It gives you the crisp, dense blackness you want for writing letters *right*. And it gives you the iron-like wearing quality you *need* for saving money.

Your Roytype Representative has a Park Avenue Ribbon with the degree of inking that meets your requirements. Ask him for a sample.



Roytype makes over 1000 different ribbons for typewriters and tabulating machines. To be sure you're using the right ribbons for the jobs you do, check with your Roytype Representative. He's studied all office jobs. His knowledge can help you. Use it!

ROYTYPE® *carbon papers, ribbons, quality supplies for all business machines*

Products of Royal McBee Corporation,
World's Largest Manufacturer of Typewriters.

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**Mr. ROY TYPE, c/o Royal McBee Corporation,
Department K, Port Chester, New York**

Say, what's all this about Roytype Creamee, a hand lotion especially made for office use? Please send information about it.

Your Name _____

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Forms used with this feature are printed with vertical lines of metallic ink at the left of each box on a fill-in form.

When the electronic sensing feature is used, tabulation is accomplished by pressing a special key. The carriage then moves until the metallic ink line is sensed by a special device and it stops just beyond the line. The typist at this point can make her entry without further tabulation or spacing.

It is no longer necessary, therefore, to set tab stops on machines which have this device, as the tabulation setting is accomplished by the business form itself. One of the advantages of this feature is that the typist no longer has the irksome task of adjusting the carriage to the boxes and therefore her work is more speedily accomplished. Another advantage is that designers of forms gain greater freedom in forms layout. It is no longer necessary for them to group the headings in vertical alignment under the smallest number of tabulation stops that can be used. This means, too, that individual blanks can be given adequate space for the information to be entered without need for space compromises in order to simplify the tabulating problem.

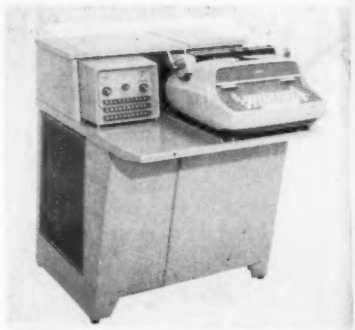
Another typewriter innovation simplifying forms entry has been the variation of the standard typewriter known as the systems machine. This is equipped with a front feed carriage and can be used in a number of bookkeeping applications. The carriage is designed to hold business forms of various types. The machine may be equipped with a device which enables continuous forms to be advanced quickly the proper number of the spaces between successive entries. Systems typewriters fit very well into payroll, accounts payable, accounts receivable and other such operations.

Smith Corona Marchant's "Galaxie".

Many machines are now equipped with a "justifying" feature which evens line lengths so that both margins are in vertical alignment. The typewriters which have this feature are very well adapted for composing type for reproduction and are often supplied with a wide variety of interchangeable type fonts, including italics and special symbols. Because they can handle type in varying sizes and styles they can be used to prepare copy for magazines, small newspapers, announcements, mailing pieces, and the like. Copy prepared on this type of machine may be photographed and reproduced in volume by offset or similar methods.

Some machines may be used to control other typewriters so that a typist at one keyboard may turn out several original copies simultaneously. This equipment can also be further adjusted so that only certain portions of the original typing are duplicated by the "slave" machines. A related set of business forms can then be prepared with one typing effort, as the appropriate information may be transferred as needed to the forms typed by the slave machines. This is the same principle used in "one-writing" bookkeeping systems. Not only can typewriters be controlled by other typewriters but they also can be controlled by automatic devices using perforated rolls like those found in player pianos. Machines using these devices can prepare letters automatically at very high speeds. Form letters may be punched into the master rolls and provisions are made so that the machine will stop to allow a typist to insert variable information such as prices, dates and names.

Recent electric model by IBM.



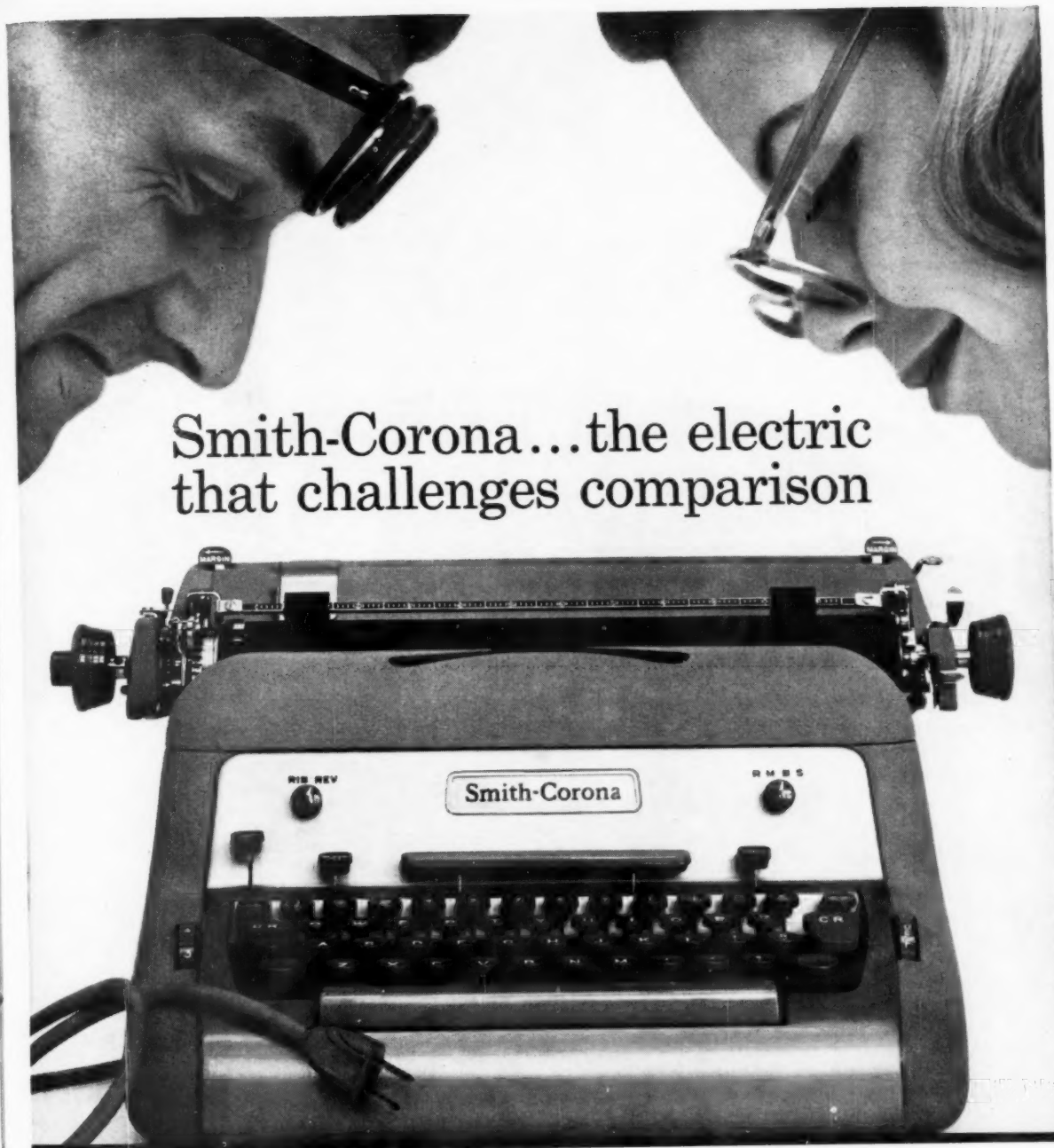
Automatic typewriters allow an operator to handle several machines at once. Shown above is American Automatic Typewriter's Model 5630 Selector Auto-Typist.

Some automatic controls are designed for use with rolls containing a selection of paragraphs which can be combined as required to create an individually typed form letter. With these controls, typewriters can be programmed to type only the desired paragraphs; the machine skips over those not being used. One variation of this occurs when a pair of rolls is used to control one machine. This permits alternate paragraphs to be typed from each roll. This is of great advantage in high volume work, because as one roll advances the other controls the typing, eliminating the time required for a machine to skip over material not used.

With automatic typing, one operator can operate two or more machines, synchronizing her work so that she can make manual fill-ins on the machines at the right time, and remove and enter letters from the machines at the right intervals. Sometimes it is possible for an operator to handle as many as four or five machines at one time.

One of the most important modifications to the typewriter in recent years has been the addition of devices which enable it to read and/or punch a code on paper tape carrying the same information appearing on the typed copy. This by-product coded information can be read in turn by other typewriters, by communications equipment, and by tape-to-card punches.

Because punched paper tape is one of the basic "common languages" for integrated data processing, the typewriter has become a



Smith-Corona...the electric that challenges comparison

ELECTRIC TYPEWRITER COMPARISON CHART	Smith Corona	Brand A	Brand B	Brand C	Brand D
AUTOMATIC MARGINS (one-hand, one-step operation)	✓			✓	
ON-OFF SIGNAL LIGHT	✓				
ERROR CONTROL (eases corrections, line justification)	✓				
PAGE GAGE (accurately indicates bottom margin)	✓			✓	
KEYBOARD SLOPE (fits natural finger movement)	✓				
CUSHIONED TOUCH (ends fingertip jar at stroke end)	✓				
WORLD'S FASTEST ELECTRIC TYPEWRITER	✓				

FASTEST PERFORMANCE! FINEST FEATURES! FIRST IN VALUE! Compare the Smith-Corona Electric Typewriter with the rest, and you'll see why it's rated *best!* Call your nearest Smith-Corona representative for a demonstration, and see the Smith-Corona Electric *before* you buy.

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Use Readers' Inquiry Coupon on Page 184

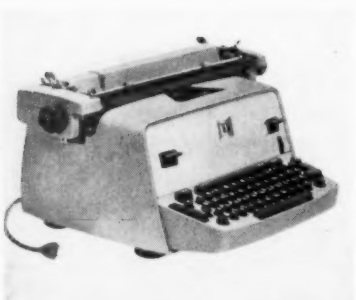
fundamental instrument for introducing data into an integrated system.

Similar codes may be punched into the edge of a card, and some typewriters are capable of both punching and reading such cards. Some typewriters used in integrated data processing systems can encode material directly on magnetic tape that is used in electronic computers and still others can print out the results of data processing from computers and from measuring equipment used in manufacturing processes.

Thus, the typewriter is still indispensable, even to the highly automated office which may use the most elaborate computer system, though historically it is one of the oldest office machines.

The list which follows covers the major manufacturers of office typewriters. The types of machines offered are indicated by the following codes:

A—Automatic typewriters, other than machines used in integrated data processing.



Two recent models are: Top, "Adler Universal from Addo-X, Inc., and bottom, "Documentor" electric typewriter by Underwood.

C—Composing and justifying machines.

IDP—Machines which read and/or produce a "common language" record or are otherwise suited for use in integrated data processing systems.

MI—Miscellaneous.

N—Noiseless machines.

PE—Portable electric machines.

PM—Portable manual machines.

SE—Standard electric machines.

SM—Standard manual machines.

SY—Systems machines.

Addo-X, Inc., 300 Park Ave., New York. (PM;SM)

R. C. Allen Business Machines, Inc., 678 Front Ave., N.W., Grand Rapids, Mich. (SE;SM)

Alma Office Machine Corp., 34 E. 30th St., New York 16. (PM;SM)

American Automatic Typewriter Co., 2323 N. Pulaski Rd., Chicago 39. (A)

American International Office Equipment Co., 7940 W. Third St., Los Angeles 48. (PM;SE;SM)

American Voss Corp., 18097 Sorrento Ave., Detroit 35. (C;PE;PM;SM;SY)

Cole Steel Equipment Co., Inc., 415 Madison Ave., New York 17. (PM)

DeJur-Amsco Corp., 45-01 Northern Blvd., Long Island City 1, N. Y. (MI-Electric carbon machine;PM;SE;SM)

Facit, Inc., 404 Park Ave. South, New York 16. (PM;SM)

Fremaco International, Inc., 188 W. Randolph St., Chicago 1. (PM;SM)

Friden, Inc., 2350 Washington Ave., San Leandro, Calif. (A;C;IDP)

Inter-Continental Trading Corp., 90 West St., New York 6. (PM;SM)

International Business Machines Corp., 590 Madison Ave., New York 22. (IDP;SE)

Olivetti Corp. of America, 580 Fifth Ave., New York 36. (C;PM;SE;SM)

Paillard, Inc., 100 Ave. of the Americas, New York 13. (PM;SE;SM)

Remington Rand Div. of Sperry Rand Corp., 315 Park Ave., South, N.Y. 10. (A;C;IDP;N;PM;SE;SM)

Robotyper Corp., 125 Allen St., Hendersonville, N. C. (A)

Royal McBee Corp., Westchester Ave., Port Chester, N. Y. (A;IDP;PM;SE;SM)

Smith-Corona Marchant, Inc., 701 E. Washington St., Syracuse 1, N.Y. (IDP;PE;PM;SE;SM)

Underwood Corp., 1 Park Ave., N.Y. 16. (A;IDP;PM;SE;SM;)

Vari-Typer Corp., 720 Frelinghuysen Ave., Newark 5, N. J. (C)

Books of Interest to Office Management

The "executive mind" — even though it may have digested a great deal of knowledge through experience—will remain relatively limited in its business scope unless it takes advantage of the information found in books. This is true especially, today, since the role of the office administrator is a nebulous one, and constantly changing in its responsibilities. Therefore, in order that business men and women in controlling positions may keep up to date with the latest and best thinking in all the areas where they must operate, the reading of books is a must. The following list offers the office administrator an excellent selection of reading material designed for his further education in the various phases of his job.

Office Automation

BUSINESS EXPERIENCE WITH ELECTRONIC COMPUTERS, by B. Conway, J. Gibbons and D. E. Watts. Controllers Institute Research Foundation, 2 Park Ave., New York 16. $5.00.

HANDBOOK OF AUTOMATION, COMPUTATION, AND CONTROL, Vol. II, edited by Grabbe, Ramo, and Wooldridge, John Wiley & Sons, Inc., 440 Park Ave. South, New York 16. $17.50.

LINEAR PROGRAMMING—METHODS AND APPLICATIONS, by Saul A. Gass, McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36. $6.50.

Systems Design And Development

ANALYZING AND IMPROVING MARKETING PERFORMANCE. American Management Association, 1515 Broadway, New York 36. AMA Report #32. $3.75/AMA members $2.50.

BUDGETING: Principles and Practice, by Herman C. Heiser. The Ronald Press Co., 15 E. 26 St., New York 10. $10.00.

BUSINESS CONTROL ATLAS. American Map Co., Inc., 16 E. 42 St., New York 17. $2.95.

CORPORATE RECORDS RETENTION, Vol. 2: A GUIDE TO CANADIAN FEDERAL AND PROVINCIAL REQUIREMENTS. Controllership Institute Research Foundation, 2 Park Ave., New York 16. $10.00.

HANDBOOK OF BUSINESS MATHEMATICS, by William Minrath. D. Van Nostrand Co., Inc., 120 Alexander St., Princeton, N. J. $9.85. (Approximate).

HANDBOOK FOR SUPERVISORS, by Ecker, MacRae, Quellette, and Telford. Prentice-Hall, Inc., Englewood Cliffs, N. J. $4.00.

HIGHER MANAGEMENT CONTROL, by T. G. Rose and Donald E. Farr, McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36. $6.50.

HOW TO COMBINE THE TAX ADVANTAGES OF BOTH CORPORATIONS AND PARTNERSHIPS FOR YOUR BUSINESS, prepared by Tax Research, Inc., a division of Research Institute of America. Random House, Inc., 457 Madison Ave., New York 22. $12.00.

KNOW YOUR SOCIAL SECURITY, by Arthur Larson. Harper & Bros., 49 E. 33 St., New York 16. $3.50.

MANAGEMENT AND ORGANIZATION, by Louis A. Allen. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36. $7.00.

MANAGEMENT FOR THE SMALLER COMPANY. American Management Association, 1515 Broadway, New York 36. $9.00/AMA members $6.00.

MANAGEMENT IN INDUSTRY, by Claude S. George, Jr. Prentice-Hall, Inc., Englewood Cliffs, N. J. $10.00.

MANAGERIAL ACCOUNTING: An Introduction, by Harold Bierman, Jr. The Macmillan Co., 60 Fifth Ave., New York 11. $10.00.

How to create

More efficient, economical offices

Planning, setting up, and administering of offices and office buildings — old and new — covered by an expert.

Just Published

This book gives practical help on every aspect of creating a modern office. Whether you are planning a new building or revising existing space in an older one, you can turn to it for realistic, proven answers. It tells you how to determine the amount of space required for office operation, how to make the maximum use of space, what to look for in office building and construction, and how to choose new office space. The emphasis is upon functional effectiveness and flexibility for future expansion or changes. How to use charts, drawings, photos, and renderings for space planning is thoroughly explained. Let tihs book show you how the proper integration of functional, physical, structural, and mechanical elements can result in truly contemporary and efficient office buildings and office layouts.

KENNETH H. RIPNEN, R.A., A.I.A., has headed his own firm of architects for the past 30 years and is well known for his work in the specialized area of office building and office layout planning. Mr. Ripnen's company was associated with planning and designing the Celanese Home Office in Charlotte which received the "Office of the Year" award in 1954.

OFFICE BUILDING and OFFICE LAYOUT PLANNING

By KENNETH H. RIPNEN

President, The Ripnen Company, Inc.

192 pages, 7¼ x 9⅞, 60 illus., $10.00

Special Foreword by CHARLES F. NOYES

Specific, practical guidance is given on working out space requirements and maintaining proper space standards for all office operations. The book covers lighting, air conditioning, underfloor ducts, partitions, color, moving to new quarters, and much more. How modern office buildings are planned and constructed is clearly described, with emphasis on structures that can be used effectively for decades to come. The author explains the outside "core" concept of office building, the use of new materials, and specific area layout for modern equipment and automated machinery. He shows how the modular system of planning and building can produce best function in the office and also allow for maximum flexibility.

The book includes a large selection of photographs and diagrams, along with detailed case histories showing how the principles and techniques described have been put into practice by leading companies.

Check these Chapters

1. The Human Element — Key to All Office Planning
2. Developing Office-Space Standards — Liberal or Economic
3. Preparing the Program of Office-Space Requirements
4. The Office Layout
5. Factors Influencing Office Space Control and Flexibility
6. Mechanical, Structural, and Physiological Elements of the Office
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MEN WHO MANAGE, by Melville Dalton. John Wiley & Sons, Inc., 440 Park Ave. South, New York 16. $6.75.

MODERN ORGANIZATION THEORY, edited by Mason Haire. John Wiley & Sons, Inc., 440 Park Ave. South, New York 16. $7.75.

OFFICE MANAGEMENT HANDBOOK, by Harry L. Wylie. The Ronald Press Co., 15 E. 26th St., New York 10. $12.00.

OFFICE MANAGER'S HANDBOOK. The Dartnell Corp., 4660 Ravenswood Ave., Chicago 40. $15.00.

PAYROLL RECORD KEEPING, by Robert L. Thistlethwaite, Gregg Publishing Div., McGraw-Hill Book Co., Inc., 330 W. 42 St., New York 36. $1.50.

STATISTICAL FORECASTING FOR INVENTORY CONTROL, by Robert G. Brown. McGraw-Hill Book Co., Inc., 330 W. 42 St., New York 36. $7.75.

STREAMLINING YOUR EXECUTIVE WORKLOAD, by Ray Josephs. Prentice-Hall, Inc., Englewood Cliffs, N. J. $4.95.

SYSTEMS AND PROCEDURES, A Handbook for Business and Industry, edited by Victor Lazzaro, Prentice-Hall, Inc., Englewood Cliffs, N. J. $10.00.

SYSTEMS AND PROCEDURES RESPONSIBILITY, by Philip H. Thurston, Harvard Business School, Div. of Research, Soldiers Field, Boston 63. $2.50.

TAX PRACTITIONERS' LIBRARY: ORDINARY AND NECESSARY EXPENSES, by William K. Carson and Herbert Weiner. The Ronald Press Co., 15 E. 26th St., New York 10. $10.00.

THE TECHNIQUE FOR PROPER GIVING, by Walter J. Held. McGraw-Hill Book Co., Inc., 330 W. 42 St., New York 36. $6.00.

WAGE DETERMINATION: AN ANALYSIS OF WAGE CRITERIA, by Jules Backman. D. Van Nostrand Co., Inc., 120 Alexander St., Princeton, N. J. $6.75.

Personnel Problems and Practice

APPRAISING EXECUTIVE PERFORMANCE, by Carl Heyer. The American Management Association, 1515 Broadway, New York 36. $4.50.

BALANCED SKILLS: MEASURE OF EFFECTIVE MANAGERS. Pamphlet 39. Small Business Administration, Lafayette Bldg., Washington, D. C.

BASIC CLERICAL PRACTICE, by Emma K. Felter and Marie Reynolds. Gregg Publishing Div., McGraw-Hill Book Co., Inc., 330 W. 42 St., New York 36. $4.48 (Text), $1.88 (Workbook).

THE DYNAMICS OF INTERVIEWING, by Robert L. Kahn and Charles F. Cannell. John Wiley & Sons, Inc., 440 Park Ave. South, New York 16. $7.75.

THE EXECUTIVE INTERVIEW, A Bridge to People, by Benjamin Balinsky and Ruth Burger. Harper & Bros., 49 E. 33 St., New York 16. $4.00.

THE EXECUTIVE SECRETARY, by Marylin C. Burke, The Bureau of Business Practice, Division of Vision, Inc., 413 Garfield Ave., New London, Conn. $3.95.

EXECUTIVE SELECTION: HOW PSYCHOLOGISTS CAN HELP, prepared by graduate students of the Harvard Business School. Management Reports, Box 136, Cambridge 38, Mass. $12.50.

FREE MAN AND THE CORPORATION, by Roger Blough. McGraw-Hill Book Co., Inc., 330 W. 42 St., New York 36. $4.50.

FRINGE BENEFITS, by Francis M. Wiste. Reinhold Publishing Corp., 430 Park Ave., New York 22. $3.75.

INDUSTRIAL JOURNALISM TODAY, Editorial Policy and Content, by James McCloskey, Harper & Bros., 49 E. 33 St., New York 16. $4.75.

LABOR-MANAGEMENT RELATIONS, by Charles Wiedemann, Reinhold Publishing Corp., 430 Park Ave., New York 22. $3.75.

MANAGER SELECTION, EDUCATION AND TRAINING, by Willard E. Bennett. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36. $6.00.

MANAGEMENT'S MISSION IN A NEW SOCIETY, edited by Dan H. Fenn, Jr. McGraw-Hill Book Co., Inc., 330 W. 42 St., New York 36. $6.00.

THE MOTIVATION TO WORK, by Herzberg, Mausner, and Snyderman. John Wiley & Sons, Inc., 440 Park Ave. South, New York 16. $4.50.

PATTERNS OF PERFORMANCE, by Eli Ginzberg and Associates, Columbia University Press, 2960 Broadway, New York 27. $6.00.

PERSONNEL ADMINISTRATION: EVALUATION AND EXECUTIVE CONTROL, by James H. Taylor. McGraw-Hill Book Co., Inc., 330 W. 42 St., New York 36. $7.00.

TOOLS OF THE OFFICE

PERSONNEL MANAGEMENT IN SMALL COMPANIES, by Frances Torbert, Institute of Industrial Relations, University of California, Los Angeles. $ .50.

THE UNCOMMON MAN—THE INDIVIDUAL IN THE ORGANIZATION, by Crawford H. Greenwalt, McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y.

WORK MEASUREMENT, by Virgil H. Rotroff. Reinhold Publishing Corp., 430 Park Ave., New York 22. $4.85.

WORK MEASUREMENT IN THE OFFICE, by Elmer V. Grille and C. J. Berg. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36. $5.75.

Miscellaneous

COLOR PLANNING FOR BUSINESS AND INDUSTRY, by Howard Ketcham. Harper & Bros., 49 E. 33 St., New York 16. $5.95.

CREATIVE DISCUSSION, by Rupert L. Cortright and George L. Hinds. The Macmillan Co., 60 Fifth Ave., New York 11. $6.00.

ENDS AND MEANS OF MODERN MANAGEMENT. American Management Association, 1515 Broadway, New York 36. Report #30. $3.75 (AMA members: $2.50).

OFFICE BUILDING AND OFFICE LAYOUT PLANNING, by Kenneth H. Ripnen. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36. $10.00.

EXECUTIVE PUBLIC SPEAKING TECHNIQUES, by Harry Simmons, Chilton Co. Book Div., 56th and Chestnut St., Philadelphia 39. $5.00.

THE FAILURE OF THE NEW ECONOMICS: An Analysis of the Keynesian Fallacies, by Henry Haazlitt. D. Van Nostrand Co., Inc., 120 Alexander St., Princeton, N. J. $7.50.

THE NEW INFLATION, by Willard L. Thorp and Richard E. Quandt. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36. $5.00.

PRINCIPLES OF BUSINESS LETTER WRITING, by Sally B. Maybury. Ronald Press Co., 15 E. 26th St., New York 10. $4.50.

READINGS IN MANAGEMENT, by Harold Koontz and Cyril O'Donnell. McGraw-Hill Book Co., Inc., 330 W. 42 St., New York 36. $6.50 Clothbound — $4.95 Paperbound.

THE ROOTS OF CAPITALISM, by John Chamberlain. D. Van Nostrand Co., Inc., 120 Alexander St., Princeton, N. J. $5.50.

WRITING BUSINESS LETTERS, by J. H. Menning and C. W. Wilkinsen. Richard D. Irwin, Inc., Homewood, Ill. $8.10.

All of the above books have been reviewed in previous issues of OFFICE MANAGEMENT. The following two are mentioned here for the first time.

HIGHER EDUCATION FOR BUSINESS, by Robert Aaron Gordon & James Edwin Howell. Columbia University Press, 2960 Broadway, New York 27. 491 pages. $3.50.

Professors Gordon and Howell claim that formal business education is inadequate to the demands of the American business community. The areas that need improvement are described, and solutions are offered. The book discusses management selection, the nature of the businessman's job in our society, the nature of decision making, and several other subjects. It is asserted in the volume that the best background for business is an undergraduate education in liberal arts or a broadly based engineering course, followed by graduate business training of a broad but rigorous kind that emphasizes the basic fields of business, the related social sciences, and sound analytical and clinical training.

RECORDS RETENTION, A Practical Guide, by William Mitchell. Ellsworth Publishing Co., 314 Newcastle Rd., Syracuse 4, N. Y. 48 pages. $5.00.

This book is an authoritative guide to the retention and disposition of business records written by the Senior Systems Analyst for Sylvania Electric Products, Inc. Mr. Mitchell's book provides schedules of the various statutes and regulations enacted by State and Federal agencies which dictate time of retention for numerous business records. A concrete analysis of these regulations is given with accompanying common-sense advice on how to comply with them. In discussing legal requirements, Mr. Mitchell says, "Upon first examining the battery of Federal and State Laws and their record keeping requirements, they seem to be a maze, full of intricate passageways, inextricable and bewildering. Fortunately, this is not really the case; sharper analysis indicates considerable duplication in requirements."

Section one of the book discusses: Establishing the Program; The Committee; Inventory of Old Records; Surveys; Questionnaire Forms; Outside Consultants; Key to the Program. In the latter section of this informative book, the records room itself is explored and dissected for possible violations of good management practices. Emphasis throughout the book is placed on keeping down the accumulation of superfluous records which are expensive to maintain.

Microfilm Equipment

Probably the most essential service offered by microfilm is the management and retention of records. Condensing records in microscopic form saves space, preserves the information, and allows easy accessibility and transportation.

However, although the need for maintaining and preserving useful documents is obviously an imperative one, and microfilming allows this to be fully accomplished in minimum space, it is equally necessary to eliminate and discard useless material. Without careful analysis of a company's material and records, there is liable to be an annual waste of thousands of dollars in storage costs or unnecessary expenditures for microfilming on a nonselective basis.

What is microfilm? Basically, it is a photographic film of small size on which reduced images of printed matter are reproduced (The contents of an entire book can be put on a strip of microfilm less than two inches wide, and only a few feet long). The strip can then be wound into a small roll and stored in a fraction of the space which the original book had occupied. The photographed copy can easily be read by putting the microfilm through a projection machine which enlarges the image of each page. Alternatively, the images can be projected onto a convenient wall surface or screen.

The rapid growth of microfilm as a systems tool is probably due to the following factors: its flexibility; its adaptability to paper filing systems; the availability of machines to produce positive prints from the film in a matter of seconds; and the appearance of portable equipment.

Microfilm reading and printing functions are often combined. Pictured above is the Universal Reader-Printer. Photo by courtesy of Documat, Inc. Machine is relatively small and compact, thus providing the advantage of easy movability.

The application of microfilm to business procedures is commonly referred to as "procedural microfilming." Procedural microfilming may operate on three different principles. The data transmission principle is used when the same information must be kept on record in a main office and also sent to various points outside the office. The moving document principle is used when any record is microfilmed so that the information it contains can be recorded at a certain point and then sent on to another point for further processing. The "freezing of a changing record" principle is used when information must be kept on record in a main office or for records which are constantly changing or records which must be processed by another department.

However, although most sources of information proclaim economy and preservation as being two of microfilm's greatest advantages, William E. Mitchell in his book, "Records Retention," offered an interesting opinion to the contrary. Mr. Mitchell says that his biggest objection to microfilming is its cost. He claims there is more expense involved than just the cost of the film and the rental charge (or depreciation) of the equipment. The labor required for preparation of the papers, the filming, and the proofreading (and occasionally having to refilm), indexing, and preparing "targets" generally runs into a great deal more than expected.

According to Mr. Mitchell, it is far more expensive to microfilm than to retain hard copies unless it is necessary for the records to be kept at least six years.

Mr. Mitchell also suggests that very few people would be particularly concerned with the preservation of records in the event of an atomic bomb attack. He explains that the results of modern war would be so disastrous that business records would probably be the last thing on anyone's mind. Besides, he

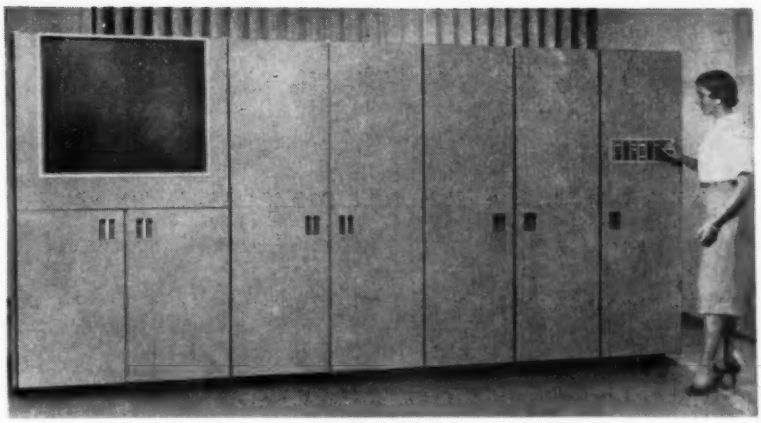
adds, if an atomic bomb should happen to land on someone's place of business, copies of what used to be there would be of small consolation.

The legal aspect of the necessity for records retention is often completely overlooked. Microfilm is very convenient in supplying data in the event of a law suit or in complying with government demands to provide records for tax and similar purposes. After an appraisal has been made of which original records are to be retained, it is important to investigate which of the records that are to be duplicated will be admissible in court. In fact, one basis for determining whether or not certain records should be microfilmed often depends upon their value as legal evidence. Most of the microfilming companies have lists of statutes and laws which state the admissibility of microfilm as primary or secondary evidence.

However, there are some business firms which maintain a ruthless campaign of record destruction based upon the premise that the costs of storing all records which might possibly be needed to defend an action exceed the cost that might stem from a law suit lost because of the lack of records.

Microfilm's applications in the academic field include the precise recording of rare manuscripts and other unique materials. Several millions of pages of manuscripts menaced by World War II were reproduced on microfilm in England.

The Federal Government, confronted with massive and growing problems of records control, has microfilmed millions of pages of material. Special Federal legislation has been enacted to ensure the legality of these reproductions and many states have enacted similar laws. V-Mail used during World War II is an example of a specific wartime application. By the time the Normandy beachhead was established during the latter part of World War II, V-Mail, started as a war measure, was so well established that more than 200 million V-Mail letters had been sent from England to the United States. The use of V-Mail reduced the weight of the mail to be transported from 270 to 31 tons. In V-Mail operations, the original letter was microfilmed, and the microfilm shipped. Upon arrival, the microfilm was enlarged to the original size as a paper print. The long part of the journey between sender and receiver of the letter — over the ocean — was taken only by the microfilm.



Above picture shows Stromberg Carlson's high-speed microfilm reader.

The basic equipment used in microfilming consists of the camera and the reader. Microfilm cameras used in the office generally fall into one of two categories: flow or planetary cameras.

The flow camera is used essentially to record documents in the office: its name is derived from the fact that records are photographed while both film and documents are moving through the camera. Synchronization of the speeds of the film and the document is made so that the leading edge of the document is filmed as it passes a certain point in the machine, and each subsequent portion of the document is filmed as it passes this same point. The flow method is very rapid and can accept thousands of documents an hour. However, it cannot accept pages from bound material unless the pages are removed.

Transport or "planetary" cameras are the second basic type of microfilm cameras, and the method used with these units more closely resembles methods used with ordinary cameras because the whole document is photographed at once. Microfilming with transport cameras is a much slower process than with the flow-type units because each item must be placed before the camera individually and removed after the photograph has been taken. Transport cameras are not really suited to rapid feeding of records and are used usually for recording large documents such as engineering drawings and blueprints. Some large documents, however, can be recorded with flow-type cameras if the cameras have extremely wide throats. The transport camera, in contrast to the flow-type, can be used to record bound material.

Microfilm cameras generally use 16mm or 35mm film, some models accepting either size; office units which will accept 70mm film or larger, while rare, are also available.

Some models can record one side of a document at a time with the image occupying width as well. In some machines "duplex" recording is possible, in which both sides of a document are filmed at once, with their images appearing side by side on the film.

Microfilm equipment varies both in size and price. A microfilm camera may be purchased at prices from $200 to $8,000; readers cost about $100 to $3,000; and enlarger-printers which make readable copies from microfilm images sell for approximately $600 to $80,000. Practically all microfilm equipment can be rented for an equally wide range of prices.

Microfilm is usually stored in boxes which carry a space on the edge which can be used to indicate the same information which might be carried by the labels on file drawers. Thus, the primary indexing information recorded on the edges of the boxes is readily visible when they are placed in the file drawer.

Spaces are provided on the side of each box in order that subdivisions of the categories so indexed may be written down. Information recorded on the side of the box represents subdivisions that correspond to those represented by file guides and subguides, such as are used in standard file drawers.

Thus, given the number or name of any record filed sequentially, the roll of film containing it may be quickly located by checking the edge of the box and then the side of the box.

Flashers used within the film to indicate the major subdivisions are just portions of the film conspicuously different from portions containing records. They are made outstandingly different from the rest of the film so that they may be spotted quickly as the film runs through the reader at high speed.

Strips of white paper such as adding machine tape may be used as flashers and inserted into the camera at appropriate intervals during the filming of records. They may be placed in the film to mark the location of key records or key numbers if a numerical system is used. If the number of flashers on a roll is indicated on the side of the box, together with the identification of adjacent records, then the viewer may find the approximate location of a wanted record by simply counting the flashers as the film moves through the reader.

The application of microfilm to a records program in libraries is extremely prevalent. One reason for this is the fact that libraries have always been concerned with the acquisition and archival preservation of knowledge in printed form. Unforunately, there are few other fields where archival preservation has been the objective. Valuable data have been lost to potential users through carelessness, lack of knowledge, and the lack of a sound record retention program. Much that we have today remains because of the permanent nature of the materials of which the document of interest was made and the fortunate yet haphazard manner in which the document was stored rather than because of forethought and preparation on the part of the originator of the document.

One significant microfilming application is the reprinting of a rare work that has a restricted circulation, or, in the case of a first printing, a work with a very narrow field of interest. A typical example is a university thesis published as a routine requirement for an academic degree.

Other applicational considerations for microrecording are:

1. It reduces the amount of storage space required for inactive records, and therefore reduces the cost of such record storage. (A typical cost might be $2 per square foot per year.)

2. It reduces the amount of floor space required for active records and therefore reduces the cost of such record storage. (A typical cost might be $8 per square foot per year.)

3. It reduces the amount of insurance coverage required or lowers insurance rates, resulting in a lowered overall cost of insurance per document stored.

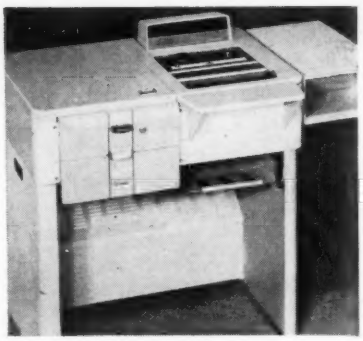
4. It permits the establishment of disaster or war damage controls.

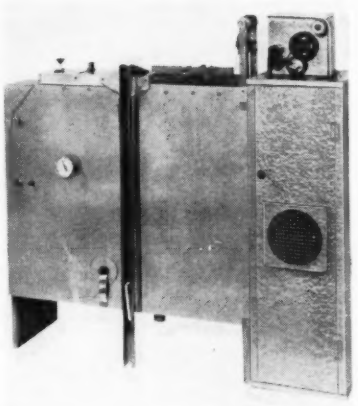
5. It permits the duplication of records and their dispersal to geographically separated areas at a cost comparable with and possibly no greater than the cost of storing the original document. This duplication and dispersal effectively avoids irrevocable loss of the records.

6. It facilitates access to all, or given, points of desired information.

These points, of course, cannot be achieved without a thorough study of the records themselves and the laws pertaining to their retention. In turn, the retention of records may be dependent upon government requirements and the value of such records as evidence in court. If they exist, some statutes admit certain types of microrecording and photocopies as primary evidence and others as secondary evidence.

"Targets" are another device used to provide additional information about records on roll film. Targets are meant to be read while the film is moving slowly or stopped, as contrasted to the flashers which are meant to be seen and understood, while the film is moving at a rapid pace. Key words such as "START" or "END" and sometimes detailed indexing information on the material in the roll of film are printed on the targets.





Above are two important microfilming devices. Top, Burroughs Style BG 205-G Recorder. Bottom, the "Unipro" by Remington Rand Div. of Sperry Rand.

Another means of indexing, other than flashers, is the recording of key items with reference to the number of feet of film that must be run to come to them. The particular reader used is equipped with a meter which shows the number of feet run; if the material is properly indexed, the meter may be used to locate the desired material.

Obviously, documents in film form must be usable in some predetermined sequence, such as numerical, alphabetical, or chronological order. A film which is cut, rearranged, and spliced may suffer as far as its legal value is concerned if the sequence of recording is pertinent.

The Manufacturers

The following list includes the major manufacturers of microfilm

equipment. It also includes suppliers of services used in preparing "unitized" microrecords.

The codes are as follows:

C—Cameras.

MI—Miscellaneous.

RF—Readers using roll film.

RO—Readers for opaque microimages.

U—Supplies and services for unitizing microimages.

Atlantic Microfilm Corp., 28 Railroad Ave., Pearl River, N. Y. (C; MI-Editing unit for film and microfilm cabinets; RO;U)

The American Microfilming Service Co., Microtape Systems, 44 Laura St., New Haven, Conn. (MI-Filing systems for opaque microimages in unitized forms; RO;U)

American Optical Co., Instrument Div., Buffalo 15, N. Y. (RO)

Browne-Morse Co., Muskegon, Mich. (MI-firm files)

Charles Bruning Co., Inc., 4700 W. Montrose Ave., Chicago 41. (MI-Enlarger, printer)

Burroughs Corp., 6071 Second Ave., Detroit 32. (C; MI-Readers which make prints or copies from film; RF)

Cook's Inc., 207 W. Lakeview Ave., Blackwood, N. J. (MI-Transparent holders)

Copycat Corp., 41 Union Square West, New York 3. (MI-Units to make prints from filming)

Diebold, Inc., Flofilm Div., P.O. Box 127, Norwalk, Conn. (C;RF; U)

Documat, Inc., 385 Concord Ave., Belmont, Mass. (C;RF;RO)

Durst (USA), Inc., 770 Eleventh Ave., New York 19. (C;MI-Unit to make prints or copies from film; RF)

Eastman Kodak Co., 343 State St., Rochester 4, N. Y. (C; MI-Enlargers, microfilm print, positive film, and projection papers; RF; RO;U)

The Filmsort Co., Div. of Minnesota Mining & Mfg. Co., Inc., Pearl River, N. Y. (R;U)

Graflex, Inc., 3750 Monroe Ave., Rochester 8, N. Y. (C)

Graphic Microfilm Corp., 115 Liberty St., New York 7. (C;RF; RO;U)

Griscombe Products, Inc., 133 W. 21st St., New York 11. (C; MI-Reader unit has print making feature; RF;RO;U)

Hall & McChesney, Inc., 1233 Oswego Blvd., Syracuse, N. Y. (U)

Haloid Xerox, Inc., 2-20 Haloid St., Rochester 3, N. Y. (MI-Microfilm xerographic printers)

F. G. Ludwig, Inc., Old Saybrook, Conn. (MI-Developer for processing enlargements from microfilm.

Microfilm Corp., 13 E. 37th St., New York 16. (C;R)

Microfilming Corp. of America, 2 Llewellyn Ave., Hawthorne, N. J. (C;RF;RO;U)

Microlex Corp., 1 Graves St., Rochester 14, N. Y. (RO)

Minnesota Mining & Mfg. Co., 900 Bush Ave., St. Paul 6, Minn. (MI-Reader which makes prints from microfilm by "Thermofax process)

Ozalid, Div. of General Analine & Film Corp., 13 Ansco Rd., Johnson City, N. Y. (C; MI-Readers which make prints from microfilm; RF;RO;U)

Remington Rand, Div., of Sperry Rand Corp., 315 Park Ave. South, New York 10. (C;RF;RO; MI-Feeders, film, and processors; U)

Security Steel Equipment Corp., Avenel, N. J. (MI-Feeders, film and processors; U)

U.S. Microfilm Co., 868 Main St., Stamford, Conn. (C;RF)

Visirecord, Inc., Copiague, L. I., N. Y. (U)

Watson Mfg. Co., Inc., 63 Taylor St., Jamestown, N. Y. (MI-Film storage cabinets)

Yawman & Erbe Mfg. Co., Inc., 1099 Jay St., Rochester, N. Y. MI-Cabinets)

Peerless Photo Products, Inc., Shoreham, L. I., N. Y. (MI-Flow-type reduction camera)

Photostat Corp., 1001 Jefferson Rd., Rochester 3, N. Y. (C;MI;RF)

Recordak Corp., 415 Madison Ave., New York 22. (C;RF;RO;U)

Acoustical Materials; Floor Coverings; Overhead Lighting Equipment; Movable Partitions

(Fundamental items essential to an office's physical welfare—its ceilings, floors, and walls)

The importance of the "physical" office has been copiously stressed for the past decade, and respect for office decor continues to gain prominence for several very logical reasons. One of the most obvious is the fact that management has become increasingly aware of the morale influence which office environment has upon personnel. The realization that employees must be able to work comfortably and happily in order to work efficiently and economically has contributed a great deal to the increasing attention given atmospheric factors such as acoustical materials, floor coverings, overhead lighting equipment, and movable partitions.

Many firms are also discovering that an attractive, well laid-out and lighted office is conducive to doing business more pleasantly, prosperously, and at the same time serves to satisfy any sense of beauty or aesthetic instinct which might arise in the business world.

Apart from environmental factors, the topics discussed in this section are pertinent to another extremely important office problem —space. The rising tide of commerce has brought with it a mushrooming of personnel rolls and a diminishing amount of space. Taking cognizance of the full scope of the problem, manufacturers have developed combination solutions. Examples of this are evident in integrated ceilings which combine acoustical control with lighting, ventilation, sprinkling systems, radiant heating and cooling, and other facilities which might be incorporated.

Acoustical and other properties are incorporated into movable partitions. Movable partitions themselves are an extremely important factor in conserving space, as well as in giving it the maximum degree of flexibility. Flooring, too, now allows the integration of facilities in certain new systems which will be discussed later.

Ceilings are the most common surfaces for acoustical treatment, although walls are often treated in noisier areas; and, as previously mentioned, a number of movable partitions also feature acoustical treatment.

Acoustical tiles which can be applied to either ceilings or walls may be made of a variety of materials. The nature of their substance and composition serves to absorb sound waves and thus prevent them from being echoed or reflected back to the working area, where good sound control is essential. Such tiles may be applied directly to the ceiling either by adhesive, nails, or screws; or they are often framed in grid systems thus constituting what is known as a "suspended ceiling." In such cases, the tiles rest in a framework or grid which is hung beneath the permanent ceiling.

Other facilities integrated

Most suspended ceilings allow the integration of other facilities with the acoustical tiles such as lighting, air diffusers, sprinkling systems, and other fixtures. The acoustical tiles rest in grids in such a way that they can be easily removed to permit access to ducts, pipes, and wiring situated above them.

Acoustical tiles are, of course, available in a wide range of designs and colors. And one may be sure of finding a tile to suit any taste – from conservative to avant-garde.

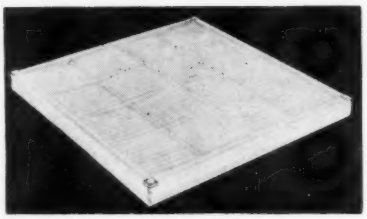
There are many different types of acoustical tiles, and the degree to which they are able to absorb sound is dependent upon their material and design.

The degree to which tiles may resist fire, of course, is another consideration in the choice of tiles. Tiles made of wood fibers, sugar cane residue, or vegetable fibers are effective acoustical materials. However, although less expensive than other types, they have less dimensional stability and are not incombustible.

Emphasis on flexibility

The rapid growth of the office function and the concurrent increase in office personnel have placed a great emphasis upon movable partitions. For flexibility of space utilization as well as for changing internal traffic to conform with changing business practices, the movable partition is essential.

Movable partitions provide privacy and at the same time promote office "circulation." Since information can be passed easily from one department to another, there is an awareness of the interdependence of the various departments. Partitions seem to present a pleasant compromise between the open office with its complete lack of privacy and the rather isolating features of offices with masonry walls. It is true, however, that movable partitions cannot always offer the same degree of privacy as is provided by permanent masonry partitions. Although visual privacy may be assured (unless undesired), the amount of aural privacy derived varies with the type and size of the partition. When partitions are of less than ceiling height, as most of them are, noise escapes over the top of the partition; however, if both the ceiling and partition are acoustically treated, noise can be reduced to a comfortable level in spite of the existing "air gap." In situations where the partition extends to the ceiling and is of the proper acoustical construction, it may be as soundproof as a conventional structural wall.



Pictured above is luminaire by Holophane Co., Inc.

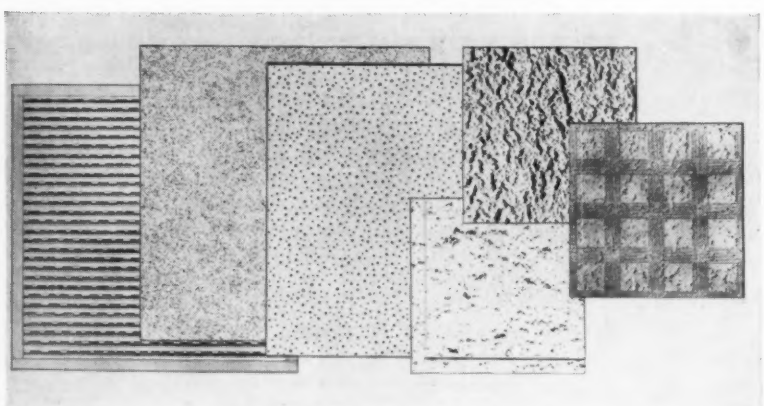
Variety of composition

Partitions range in height from low "railing" types to ceiling-height units and may be made of many different materials. Although a large number are constructed of steel, many manufacturers also offer partitions of asbestos, glass, wood, mineral compositions, and other substances.

Partitions may have panels of glass, pegboard, chalkboard, corkboard, reinforced plastic, and a variety of other materials. With the growing emphasis upon office decor, most partitions are available in a number of attractive colors and finishes. Some are designed to support bookshelves, lighting fixtures, and letter trays. A great many partitions provide both acoustical and fire-resistant qualities.

Perforated metal tiles consist of a perforated metal facing with a backing pad (usually of mineral wool) which absorbs sounds passing through the perforations. Plastic faced tiles are also available.

Most tiles may be purchased in a great variety of designs, including types with regularly spaced perforations or random performations, striated patterns, fissured designs,

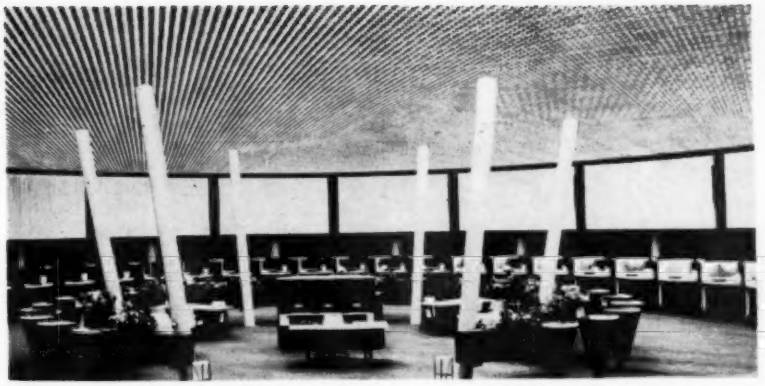


Shown above are acoustical ceiling tiles by Celotex in six different patterns.

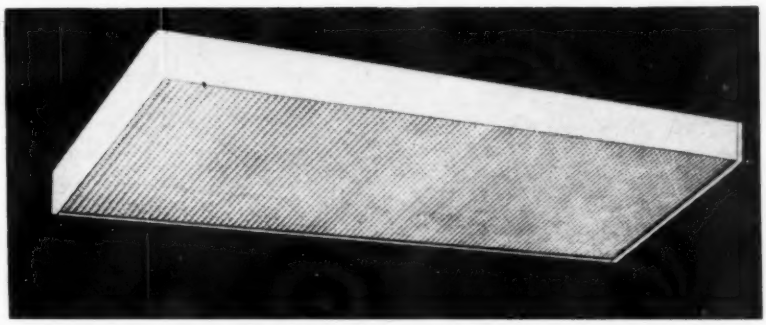
slotted surfaces, and various textured finishes. Many are available in different colors.

Mineral fiber, glass fiber, and asbestos tiles are all incombustible. These tiles usually have an acoustical backing which absorbs sound passing through perforations in the tile surface.

Folding walls and doors are becoming increasingly popular in new buildings. They provide maximum flexibility and are extremely useful in providing areas for conferences or meetings. Space is utilized to a high degree because through use of folding walls or doors, one large area can be sub-divided to accommodate several different groups at the same time. Folding walls and doors usually ride suspended from overhead tracks. Some can be operated electrically and a number are manually opened and closed.



Pictured above is a "Leaf-Lite" luminous ceiling installation which is featured in the Central Bank and Trust Co. of Denver, Colo. Leaves are mauve and white. Photo by courtesy of Luminous Ceilings, Inc.



Shown above is "Prismalux" luminaire by Lightolier. This type of fluorescent luminaire diffuses the light in such a way that it is never concentrated at any one point, thus eliminating the eye fatigue caused by bright light sources.

Lighting

Fluorescent lighting is used in most offices today. It is generally superior for work purposes to incandescent lighting because it provides more light per unit of electricity and is, therefore, more economical; it also gives off less heat and distributes light with a greater degree of evenness.

Luminous ceilings usually consist of rows of fluorescent fixtures installed above a translucent plastic or glass ceiling, although "egg-crate" louvers are often employed in lieu of the translucent plastic or glass. This type of ceiling produces lighting of great evenness. Since light is diffused over the entire office area, there is no shadow and no glare no matter where partitions or other office equipment may be placed.

Some of the newer fluorescent fixtures combine lighting and air conditioning functions in the fixtures themselves; this is accomplished through the use of slots in the fixtures holding the fluorescent tubes. These slots transmit a vertical air flow from diffusers mounted above.

Fluorescent lighting, too, is available in a large choice of color gradations, and so its effects upon the appearance of the office are multifold.

Another basic must in maintaining adequate lighting is avoidance of too much contrast in the light-reflecting qualities of various objects in the room. Excessive contrast in the brightness of office furniture, machines, and papers forces the eye to constantly adjust as it moves from one object to another. This is the reason that most modern desks have light colored tops that do not contrast too markedly with the papers that rest upon them.

Light should always be diffused in such a way that it is never concentrated at any one point since the eye suffers when confronted with bright light sources.

Appearance, cost, and maintenance are the first considerations involved in choosing a floor covering. However, a great deal of attention is presently being paid to certain supplementary factors like acoustical properties and personal safety. And, of course, new trends in office decor have produced an

Pictured above is Flor-Ever "Cosmopolitan" vinyl by Congoleum Nairn, Inc.

extensively varied choice of color and design.

Floor tiles may be made from a variety of materials. Among the most common are asphalt, linoleum, vinyl asbestos, solid vinyl, rubber, and cork, all of which will be briefly described. Many of these are available in roll form, and most tiles are manufactured in an assortment of sizes, shapes, and colors.

The Manufacturers of Acoustical Materials

The following list of manufacturers indicates the principal makers of acoustical products used in offices.

The following codes are used:

B—Acoustical baffles such as may be used with luminous ceilings.
H—Hoods and cabinets used to enclose office machines.
MI—Miscellaneous.
PS—Acoustical plasters and sprays.
SC—Suspended ceilings-i.e. grids and other structures used to support tiles, lighting fixtures, etc.
TC—Ceiling tiles and panels.
TW—Wall tiles and panels.

Accesso Systems, Inc., 1500 Westlake North, Seattle 9, Wash. (SC)
Airtex Corporation, 2900 N. Western Ave., Chicago 18. (TC)
Armstrong Cork Co., Liberty & Mary Sts., Lancaster, Pa. (TC; TW)
Benjamin Electric Mfg. Co., Des Plaines, Ill. (B)
Burgess-Manning Co., 749 E. Park Ave., Libertyville, Ill. (TC;MI-Acousti-Booths for telephones)
The Celotex Corp., 120 S. La Salle St., Chicago 3. (TC)
Curon Div., Curtiss-Wright Corp., 50 Rockefeller Center, New York 20. (TC;TW)
G. R. Products, Inc., 2417 Eastern Ave. S. E., Grand Rapids, Mich. MI-Acoustical movable partitions and walls)
Gates Acoustinet Co., 532 Spaulding Yates Bldg., Sheridan Dr., Tonawando 7, N. Y. (H)
The Goodyear Tire & Rubber Co., 1144 E. Market St., Akron 16, Ohio. (TW)
Johns-Manville, 22 E. 40th St., New York 6. (TC)
Keasbey & Mattison Co., 1955 Butler Ave., Ambler, Pa. (PS)
Lahabralite Co., 1631 W. Lincoln, P. O. Box 2005, Anaheim, Calif. (PS)
Marsh Wall Products, Inc., Dover, Ohio. (TW)
Mastic Tile Corp. of America, Box 1151, Newburgh, N. Y. (TW)
Mid West Noise Control Co., 6265 Carrolton, Indianapolis. (B)
Minnesota & Ontario Paper Co., Insulite Div., Baker Arcade Bldg., Minneapolis, Minn. (TC)
National Gypsum Co., 325 Delaware Ave., Buffalo 2, N. Y. (TC)
New England Lime Co., Nelco Acoustical Tile Div., Adams, Mass. (TC;TW)
F. E. Schundler & Co., Inc., 504 Railroad St., Joliet, Ill. (PS;TC)
Simpson Logging Co., 1010 White Building, Seattle, Wash. (MI-Metal acoustical units, perforated cement asbestos and hardboard; TC;TW)
Sylvania Electric Products, Inc., 7014 Broadway, N. Y. (B)
Tectum Corp., 105 E. Sixth St., Newark, Ohio. (TC-Non-combustible structural material for exposed roof deck)
U. S. Gypsum Co., 300 W. Adams St., Chicago 6. (TC;PS)
The F. W. Wakefield Brass Co., 731 S. Water St., Vermilion, Ohio. (B;SC)
Watkins Industries, 9 Superior St., Youngstown, Ohio. (H)
Zonolite Co., 135 S. La Salle St., Chicago 3. (PS)

The Manufacturers of Floor Coverings

This list includes manufacturers of carpeting, linoleum, tiles of various types, and similar materials.

The following codes are used to indicate the types of products made by each manufacturer:

C—Carpeting, material either not specified or as indicated.
CA—Carpeting, acrilan.
CC—Carpeting, cotton.
CN—Carpeting, nylon.
CW—Carpeting, wool.
L—Linoleum.
MI—Miscellaneous.
MR—Matting, rubber.
T—Tiles, material either not specified or as indicated.
TA—Tiles, asphalt.
TC—Tiles, cork.
TL—Tiles, linoleum.
TR—Tiles, rubber.
TV—Tiles, solid vinyl.
TVA—Tiles, vinyl, asbestos.
TVP—Tiles, vinyl plastic.

Ace Lite Step Co., 1708 S. State St., Chicago 16. (MR;TR)
Aldon Rug Mills, Inc., 10 W. 33rd St., New York. (C)
American Biltrite Rubber Co., Inc., Foot of Perrine Ave., Trenton 2, N. J. (MI-Rubber carpeting; MR; TR;TV)
Armstrong Cork Co., Lancaster, Pa. (C-Deltox; L; MR; TA; TC; TL; TR;TV;TVA)

Many offices are now enjoying linoleum floors. Durable and easy to clean, they also present an attractive appearance. Photo by courtesy of Armstrong Cork Co.

Axtloom Carpet Co., Inc., 4201 Pulaski H'way, Baltimore. (CA;CN; CR;CW)

Bigelow-Sanford Carpet Co., Inc., 140 Madison Ave., New York 16. (C)

Bird & Son, Inc., East Walpole, Mass. (L; MI-Vinyl sheet goods; TL)

Bonafide Mills, Inc., 295 Fifth Ave., New York 16. (L;MI-Vinyl plastic rolls; TA;TL;TV;TVA;TVP)

The Philip Carey Mfg. Co., Lockland, Cincinnati 15. (TA)

Collins & Aikman Corp., 210 Madison Ave., New York. (CN)

Congoleum-Nairn, Inc., Gold Seal Div., 195 Belgrove Dr., Kearny, N. J. (L; MI-Vinyl sheet goods, rotogravure vinyl; enamel surface sheet goods; TA;TC;TR; TV;TVA;TVP)

Crown Rubber Co., 1615 Croghan St., Fremont, Ohio. (C-Nylon-viscose and viscose; R-Vinyl with foam rubber backing; T-Nylon-rayon impregnated rubber)

Deltox Rug Co., 35 Wisconsin St., Oshkosh, Wis. MI-Fibre rugs)

Duraloom Carpet Mills, Inc., 38 E. 75th St., New York 21. (C)

Fibreboard Paper Products Corp., Pabco Floor Covering Div., 475 Brannan St., San Francisco 19. (L; MI-Vinyl rolls; TL)

The Firth Carpet Co., 295 Fifth Ave., New York 6. (C-Blends of wool and other materials; CA; CW)

The Flintkote Co., The Tile-Tex Div., 1232 McKinley Ave., Chicago Heights, Ill. (T-Industrial; T-Plastic asbestos; TA;TVA)

The B. F. Goodrich Co., Flooring Products Div., Watertown 72, Mass. (MI-Rubber stair treads; TA;T)

Floating Floors, Inc., 22 E. 42nd St., New York 17. (MI-raised floor consisting of self-locking floor plates which rest on pedestals standing freely on sub-floor)

The B. F. Goodrich Co., Flooring Products Div., Watertown 72, Mass. (MI-Rubber stair treads; TA;TR;TV;TVA)

The Goodyear Tire & Rubber Co., 1144 E. Market St., Akron, Ohio. (MI-Rolls of rubber and Vinyl, airfoam padding for use under carpeting; TR;TV)

Hygienic Dental Mfg. Co., Flooring Division, Dept. M., Akron 10, Ohio. (TR)

Many executive suites are now characterized by rich carpeting effects similar to those found in palatial private homes. Above picture by courtesy of James Lees & Sons.

Johns-Manville Co., 22 E. 40th St., New York 16. (TA;TVA)

Karastan Rug Mills, 295 Fifth Ave., New York 16. (C)

Kentile, Inc., 58 Second Ave., Brooklyn 15, N. Y. (TA;TC;TV;TR; TVA)

James Lees & Sons Co., Bridgeport, Pa. (CA; CC; CN; CR; CW; MI-Wool-nylon blends)

The Magee Carpet Co., 295 Fifth Ave., New York 16. (C;CA;CC; DN;DR;CW)

Mastic Tile Corp. of America, P.O. Box 128, Vails Gate, N. Y. (T; TA;TR;TV;TVA)

Minnesota Mining & Mfg. Co., 900 Bush St., St. Paul 6, Minn. (MI-Resilient floor covering)

Mohawk Carpet Mills, Inc., Div. of Mohasco Industries, Inc., Amsterdam, N. Y. (C-Viscose rayon; C-Dynel; C-Special compositions; CW; MI-Carpet cushioning)

National Tile & Mfg. Co., Anderson, Ind. (T-Ceramic)

The R.C.A. Rubber Co., 1833 E. Market St., Akron 15, Ohio. (MI-Vinyl and rubber roll goods; TR; TV)

Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J. (MR)

Robbins Floor Products, Inc., Tuscumbia, Ala. (TC;TR;TV)

Alexander Smith, Inc., 295 Fifth Ave., New York 16. (C-Synthetic yarns; CW)

Sorkin Enterprises, 11 Broadway, New York 4. (C-Vinyl)

Tab Products Co., 995 Market St., San Francisco 3. (MR)

Unistrut Products Co., 933 Washington Blvd., Chicago. (MI-Elevated adjustable floor system)

Uvalde Rock Asphalt Co., 500 Frost Bank Bldg., San Antonio, Tex. (T-Vinylized; T-Industrial vinyl; TA;TVA)

Weber Showcase & Fixture Co., Inc., 5700 Avalon Blvd., Los Angeles 11. (MI-Computer flooring for use with EDP machinery)

The Manufacturers of Overhead Lighting Equipment

The following list includes the major manufacturers of various types of overhead lighting equipment.

The code symbols used in the list are as follows:

F—Fluorescent fixtures.

I—Incandescent fixtures.

L—Luminous ceilings.

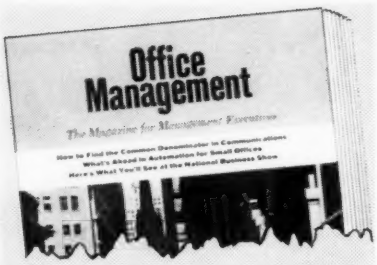
Benjamin Electric Mfg. Co., Subsidiary of Thomas Industries; Inc., Des Plaines, Ill. (F;I;L)

Corning Glass Works, Corning, N. Y. (F;I)

Daybrite Lighting, Inc., 6260 N. Broadway, St. Louis 15, Mo. (F;I)

The Electron Corp., P.O. Box 208, Littleton, Colo. (F)

General Electric Co., Nela Park, Cleveland 12. (F)



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Executive Office Furniture	83.2
Office Machines	98.4
Duplicating & Photocopying Equip.	94.8
Electronic Equipment	75.3
Tel. & Tel. Service	90.7
Inter-Office Communication System	89.0
Mail Room Equipment and Supplies	89.9
Office Acoustical Material	78.5
Office Partitions	84.9
Office Floor Covering (Carpeting, Tile, Etc.)	80.5
Office Floor Maintenance, Equipment & Supplies	77.3
Water Coolers	74.5
Employment of General Office Personnel	94.1
Insurance & Welfare Plans	73.0
Office Relocation	81.0

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The Magazine for Management Executives

A GEYER McALLISTER PUBLICATION

212 Fifth Ave., New York 10, N. Y.

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TOOLS OF THE OFFICE

Edwin F. Guth Co., 2615 Washington Blvd., St. Louis 3, Mo. (F;I;L)

Holophane Co., Inc., 342 Madison Ave., New York 17. (F;I;L)

Lightolier, Inc., Jersey City 5, N. J. (F;I)

Luminous Ceilings, Inc., 2500 W. North Ave., Chicago 47. (LC)

The Miller Co., 99 Center St., Meriden, Conn. (F)

Owens-Corning Fiberglass Corp., Toledo 1, Ohio. (F)

Pyle-National Co., 1334 N. Kostner Ave., Chicago 51. (MI-fixture which combines lighting and air diffffusion)

Pittsburgh Reflector Co., Oliver Bldg., Pittsburgh 22. (F;I;L)

Silvray Lighting, Inc., 100 W. Main St., Bound Brook, N. J. (F;I;L)

Solar Light Manufacturing Co., 400 N. Ashland Ave., Chicago 22. (F;I)

Swing-O-Lite, 13 Moonachie Rd., Hackensack, N. J. (F;I)

Sylvania Electric Products, Inc., Fixture Division, Wheeling, W. Va. (F;L)

Unistrut Products Co., 933 W. Washington Blvd., Chicago 7. (L)

The Wakefield Co., 731 S. Water St., Vermilion, Ohio. (F;I;L)

Westinghouse Electric Corp., Lighting Division, 1216 W. 58th St., Cleveland, Ohio. (F)

M. G. Wheeler Co., Inc., Greenwhich, Conn. (MI-Sight-Light line of lighting fixtures.)

The Manufacturers of Movable Partitions

The following list includes the major manufacturers of various types of movable partitions.

The code symbols used in the list are as follows:

PFS—Free standing partitions.
A—Acoustical.
G—Glass.
F—Fire resistive.
M—Metal.
MI—Miscellaneous.
W—Wood.
WF—Folding wall.

Art Metal Construction Co., 41 E. 42nd St., New York 17. (PFS-S,G)

Bemis Bros. Bag Co., 408 Pine St., St. Louis 2. (WF-A,F)

Browne-Morse Co., Muskegon, Mich. PFS;WF)

Corry-Jamestown Mfg. Corp., Corry, Pa. (PFS-G)

L. A. Darling Co., Bronson, Mich. (MI)

D & L Office Furniture Co., Inc., 61 W. Hubbard St., Chicago 10. (PFS-MI)

GR Products, Inc., 2147 Eastern Ave., S.E., Grand Rapids, Mich. (PFS-A,G,M,W)

The General Fireproofing Co., Youngstown 1, Ohio. (PFS-A,G,M)

General Plywood Corp., 3131 W. Market St., Louisville, Ky. (PFS-MI,W)

General Steel Products Corp., 131 Avery Ave., Flushing, N. Y. (PFS-M,MI)

Globe-Wernicke Co., Cincinnati 12, Ohio. (PFS-A,G,M)

The E. F. Hauserman Co., 6800 Grant Ave., Cleveland, Ohio. (PFS-A,G,M,MI)

Hemisphere Steel Products Corp., 263 Kent Ave., Brooklyn 11, N. Y. (PFS-G,M,MI)

H-O-N Co., Muscatine, Iowa. (PFS-M,MI)

Johns-Manville, 22 E. 40th St., New York 16. (PFS-F,W)

Marnay Sales, Div. of Rockaway Metal Products Corp., SEE: Rockaway Metal Products Corp., Marnay Sales Div.

The Mills Co., 965 Wayside Rd., Cleveland 10. (PFS-M)

National Gypsum Co., Cold Bond Bldg., 325 Delaware Ave., Buffalo, N. Y. (PFS-A,MI)

New Castle Products, Inc., New Castle, Ind. (WF-M,W)

Peerless Steel Equipment Co., Unruh & Hasbrook Ave., Philadelphia 11. (PFS-M)

Richards-Wilcox Mfg. Co., Aurora, Ill. (WF-M,W,MI)

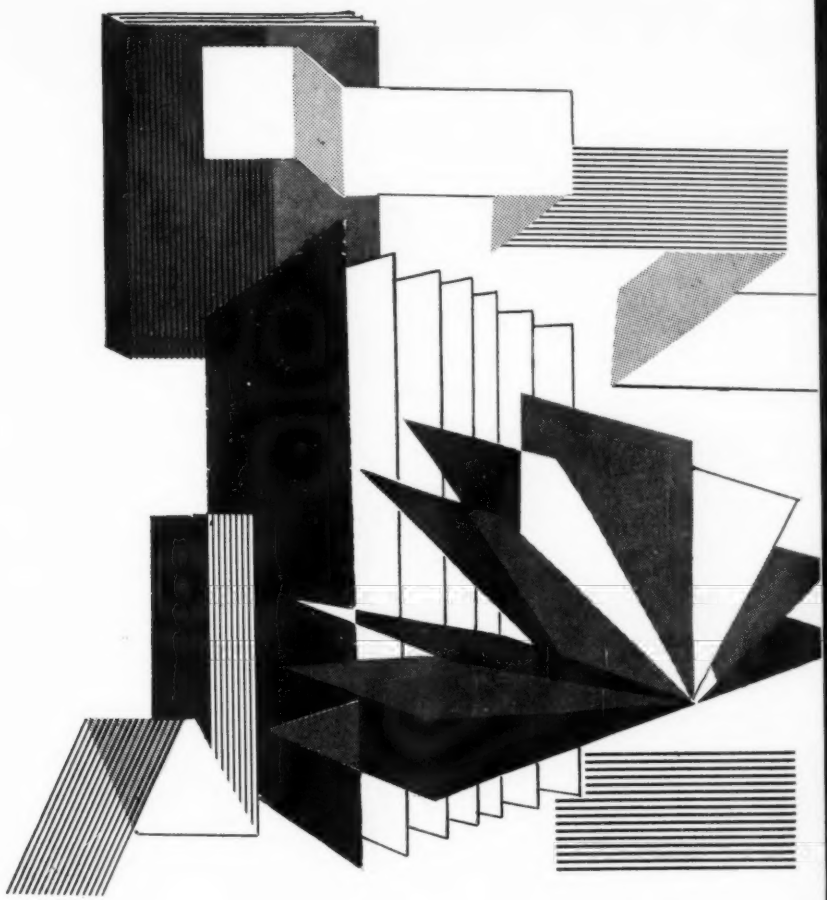
Rockaway Metal Products Corp., Marnay Sales Div., 41 E. 42 St., New York 17. (PFS-G,M,MI)

United States Gypsum Co., 300 W. Adams St., Chicago 6. (PFS-MI)

United States Plywood Corp., 55 W. 44th St., New York 36. (PFS-A, F,MI)

Virginia Metal Products, Inc., Orange, Va. (PFS-A,F,G,MI)

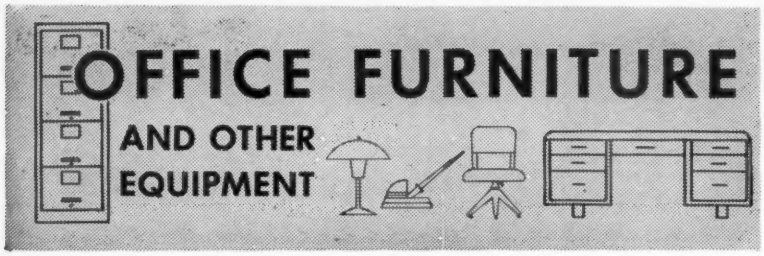
Yawman & Erbe Mfg. Co., 1099 Jay St., Rochester 3, N. Y. (PFS-M, MI)



CATALOGS

BOOKLETS, BROCHURES

Essential to intelligent selection of equipment and supplies for every well-run office are detailed descriptions, specifications, and applications of the multitude of machines, forms, furniture, fixtures, and small items that the office requires. On the following pages appears a listing of current catalogs of interest to office management.



All-Steel Equipment, Inc., Aurora, Ill. A booklet entitled *How to Buy Office Furniture.* (1)

Arnot Furniture Div. of Royal Metal Mfg. Co., 1 Park Avenue, New York 16, N. Y. Brochure describing modular furniture and space dividing partitions. (2)

Atlas Vertical Filing Systems, Div. Atlas Stencil Files Corp., 16716 Westfield Ave., Cleveland 10. Literature on vertical filing systems for offset plates, negatives, stencils, blue prints, etc. (3)

Bankers Box Co., 2607 N. 25th Ave., Dept. OM-1, Franklin Park, Ill. Catalog depicts filing products. Company letterhead required. (4)

The Bentson Mfg. Co., Aurora, Ill. *Suggested Specifications for Top Quality Steel Desks and Filing Cabinets,* gives detailed drawings of company's products. (5)

Bevco Precision Mfg. Co., 831 Chicago Ave., Evanston, Ill. Information on Bevco ventilated chairs and chrome coat and hat racks. (6)

Browne-Morse Co., Muskegon, Mich. Catalog, *Coordinate Group,* displays company's latest modular office furniture. (7)

John D. Brush & Co., Inc., 545 West Ave., Rochester 11, N. Y. Literature on the Sentry line of fire resistive safes and filing equipment. (8)

Burgess-Manning Co., Architectural Products Div., 749 East Park, Libertyville, Ill. Bulletin No. A-142-4N for descriptions and prices of acoustical telephone booths. (9)

Cole Steel Equipment Co., Inc., 415 Madison Ave., New York. 80-page, illustrated catalog featuring executive and general office furnishings. (10)

Columbia-Hallowell Div., Standard Pressed Steel Co., Jenkintown, Pa. Standard line of desks, credenzas, bookcases, etc., shown in catalog, *Office Furniture By Columbia.* (11)

Convoy, Inc., Canton 6, Ohio. Literature on Low Cost Storage Files. (12)

Corry-Jamestown Corp., Corry, Pa. Literature on modular office furniture entitled, *Discover New Correlation.* (13)

Covercraft Co., Inc., P. O. Box 417, Goshen, Ind. Illustrated brochure on "Coverteers" office seating, slip-on upholstery. (14)

Cramer Posture Chair Co., Inc., 625 Adams, Dept. OM-12, Kansas City 5, Kan. Literature on replaceable seat covers for posture chairs. (15)

Cushman & Denison Mfg. Co., Inc., 730 Garden St., Carlstadt, N. J. Catalog depicts Whirl-O-Dex rotary card filing system. (16)

DeLuxe Metal Products Co., Warren, Pa. Catalog #305 describes combination wardrobe and storage cabinet, and counter high cabinet line. (17)

Dolin Metal Products, Inc., 315 Lexington Ave., Brooklyn 16, N. Y. The "idea kit" describes Dolin Mobile Storage System. (18)

E. I. Du Pont de Nemours & Co., Inc., 2537 Nemours Bldg., Wilmington 98, Del. Fabrilite Sample Card contains swatches of vinyl upholstery. (19)

Estey Corp., One Catherine St., Red Bank, N. J. Illustrated brochure depicts open shelf filing equipment. (20)

General Fireproofing Co., Youngstown 1, Ohio. An informative booklet, *Plan to Profit From Your Office Investment.* (21)

The Globe-Wernicke Co., Cincinnati 12, Ohio. Catalog on "Techniplan" metal modular business equipment. (22)

Hale Industries, Inc., Herkimer, N. Y. Literature describes a line of wooden bookcases, sectional and non-sectional. (23)

Hamilton Cosco, Inc., 2525 State St., Columbus. Ind. Complete catalog of office chairs, executive and standard; illustrated in color. (24)

The E. F. Hauserman Co., 5711 Grant Ave., Cleveland 5. Brochure on full line of Hauserman movable interior walls. (25)

Johns-Manville Corp., Box 158, New York 16. Details on the new "Lay-In" acoustical Panelglas. (26)

Macey Fowler, Inc., 305 E. 63rd St., New York 21. Illustrated brochure, *Professional Tools,* gives advice in furnishing executive or general offices. (27)

Marnay Sales Div., Rockaway Metal Products Corp., 41 E. 42nd St., New York 17. Full color catalog on office layouts with movable partitions. (28)

The Mills Co., 960 Wayside Rd., Cleveland 10, Ohio. Planning kit to help in organizing office space with movable walls. (29)

Bert M. Morris Co., 8651 W. 3rd St., Los Angeles 48. Literature on "Matched Desk Top Equipment" in the planned office. (30)

National Vulcanized Fibre Co., Box 311, Wilmington 99, Del. Literature describes the Vul-Cot waste basket line. (31)

Pronto File Corp., 415 Madison Ave., New York 17. Catalog on Pronto storage cabinets. (32)

Ramsey Co., 116 S. Seventh St., Philadelphia 6. Detailed bulletin on Tract-A-File cabinets. (33)

Remington Rand Div. of Sperry Rand Corp., 315 Park Ave. South, New York 10. Illustrated folder LBV79 on company's Kompakt files. (34)

Richcraft Furniture Corp., P. O. Box 2353 Tulsa, Okla. Catalog depicts a spring suspension "pendulum motion" office rocking chair. (35)

The Shaw-Walker Co., Muskegon, Mich. 244-page, illustrated catalog describes office furnishings and equipment; prices given. Request on business letterhead. (36)

Shepherd Casters, Inc., P. O. Box 672, Benton Harbor, Mich. Catalog of office chair casters with specifications and caster fitting guide. (37)

Office Accessories Corp., 660 S. Fair Oaks Ave., Pasadena 2, Cal. Brochures describe moistener, stamp holder, letter opener, etc. (38)

Luxco, Inc., 100 King St., LaCrosse, Wis. Brochure illustrates and describes executive, secretarial, arm and side chairs, in wide selection of fabrics. (39)

Radex Corp., 2076 Elston Ave., Chicago 14. Literature describes Dustronic air cleaners with electrostatic filters. (40)

Tab Products Co., 995 Market St., San Francisco 3. Catalog #10 depicts company's Spacefinder Shelf Files. (41)

Tropicraft Woven Wood Products, Inc., 568 Howard St., San Francisco 5. Literature describes office divider screens, shades, and general furnishings. (42)

United States Gypsum, Dept. OM-94, 300 W. Adams St., Chicago 6. Illustrated booklet depicts E-Z Wall Movable Partition system. (43)

Vogel-Peterson, Rt. 84 & Madison St., Elmhurst, Ill. Bulletin DL-61 on aluminum coat and hat racks. (44)

Wheeldex & Simpla Products, Inc., 1000 N. Division St., Peekskill, N. Y. Literature discusses the production, automatic filing, and finding of microfilm aperture cards by the U. S. Army Signal Corps. (45)

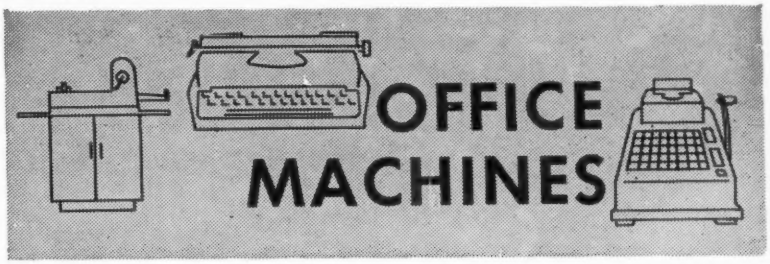
Wood Office Furniture Institute, 1414 Eye St. N.W., Washington 5, D. C. A 24-page booklet, *Listening For Color*, studies the use of color in the office. $.50. (46)

Workwall Div., L. A. Darling Co., Bronson, Mich. A full color catalog shows possible combinations of movable partitions. (47)

The Wright Line, Inc., 160 Gold Star Blvd., Worcester, Mass. Booklet describes line of data processing accessory equipment. (48)

Vue-Fax Div., Logan Business Products, Inc., 655 Main St., Westbury, N. Y. Literature on specific applications (inventory control, I.D.P., etc.) involving Vue-Fax visible filing equipment. (49)

Yawman & Erbe Mfg. Co., Inc., Rochester 3, N. Y. Catalog depicts a complete line of modern steel office furniture. (50)



A. B. Dick Co., 5700 W. Touhy Ave., Chicago 48. Catalogs featuring a wide range of duplicating equipment: offset, photocopy, spirit, azograph, and mimeograph. (51)

Addo-x, Inc., 300 Park Ave., New York 22. Class 2000 booklet explaining, with illustrations, the functions of the new push-button adding machine and multiplier. (52)

American Automatic Typewriter Co., 2323 N. Pulaski Rd., Chicago 39. *60 Best Business Letters* gives information on the Auto-typist. (53)

American Numbering Machine Co., Atlantic & Shepherd Ave., Brooklyn 8, N. Y. *Numberama*, a descriptive brochure of numbering and dating machines. (54)

Ayres Corp., P. O. Box 1081, Wilmington, Cal. Catalog describes the Payroll Tax Computer. (55)

Burroughs Corp., Detroit 32. An illustrated booket discusses the F5000 accounting machine with dual printer. (56)

Cole Steel Office Machines, Inc., 415 Madison Ave., New York 17. Brochures describe the company's portable typewriter, dictating machine, and duplicator. (57)

Collamatic Collators, Inc., Rt. 23, Wayne, N. J. Catalog on semi-automatic and automatic collating equipment. (58)

Control Systems, Inc., 5 Beekman St., New York 38. Illustrated brochures depict the company's line of adding and calculating machines. (59)

Copease Corp., 425 Park Ave., New York 22. *The Truth About Office Copying Machines* describes the various processes used by different copying machines. (60)

Datamatic Div., Minneapolis-Honeywell, Newton Highlands 61, Mass. Summary description of Honeywell 800 data processing system for business and scientific use. (61)

DeJur-Amsco Corp., 45-01 Northern Blvd., Long Island City 1, N. Y. Complete details on Stenorette "T" and Stenorette Companion dictating machines. (62)

Digitronics Corp., Albertson Ave., Albertson, L. I., N. Y. Catalog TS 129 describes Dykor all transistorized tape reader. (63)

Documat, Inc., 385 Concord Ave., Belmont 78, Mass. Literature on the company's new microfilm reader-printer. (64)

Eastman Kodak Co., Rochester 4, N. Y. Brochure describes the Ektalith Method of document reproduction. (65)

Executone, Inc., 415 Lexington Ave., New York 17. Case histories and a catalog on improving customer service through electronic intercom. (66)

Fairchild Camera & Instrument Corp., Industrial Camera Div., 5 Aerial Way, Syosset, N. Y. Illustrated brochure on equipment for making identification photographs. (67)

Farrington Mfg. Co., Needham Heights 94, Mass. Brochures on optical character recognition equipment for input to computer and punched card systems. (68)

Felins Tying Machine Co., 3351 N. 35th St., Milwaukee 16, Wis. Catalog describes package tying machines. (69)

Filmsort Div., Minnesota Mining and Mfg. Co., 900 Bush Ave., St. Paul 6, Minn. Literature on mount-

ing microfilm in Filmsort aperture cards. (70)

Gates Acoustinet, Inc., 633 Spaulding Yates Bldg., Sheridan Dr., Tonawanda, N. Y. Catalog describing complete line of acoustinets for office machines. (71)

Gestetner Corp., 216 Lake Ave., Yonkers, N. Y. Illustrated brochure depicts the new 300 series of stencil duplicators. (72)

Haloid Xerox, Inc., 2-20 Haloid St., Rochester 3, N. Y. Catalog depicting the automatic Xerox 914 office copier. (73)

Industrial Shredder & Cutter Co., 301 Mill St., Salem, Ohio. Brochure describes office paper shredder. (74)

Kalvar Corp., 909 S. Broad St., New Orleans 25, La. Company's printing and developing equipment displayed in catalog of reproduction systems.

Kenro Graphics, Inc., 25 Commerce St., Chatham, N. J. Literature describes the company's vertical process cameras for platemaking and photocopying. (76)

Lamb Electric Co., Div. of American Machine and Metals, Inc., Vent, Ohio. Bulletin 59 treats special application of fractional horsepower electric motors. (77)

Macey Co., 13835 Enterprise Ave., Cleveland 35. Brochure describes the company's Stitch-A-Fold binding machine. (78)

Magna-phone Sales Co., 304-306 N. Fourth Ave., Rome, Ga. Brochure shows the "hands free" use of Magna-phone. (79)

The Mead Corp., Dayton 2, Ohio. A production manual shows methods of increasing production with small offset presses. (80)

M. C. Mieth Manufacturers, 665 Herbert St., Port Orange, Fla. Catalog M-200 depicts hand punches for every purpose. (81)

Monroe Calculating Machine Co., Inc., 555 Mitchell St., Orange, N. J. *The Eternal Quest for Time* is a small catalog showing company's calculating, accounting, and data processing machines. (82)

Moore Business Forms, Inc., 900 Buffalo Ave., Niagara Falls, N. Y. Complete details on company's Speeditacher. (83)

The National Cash Register Co., Main & K Sts., Dayton 9, Ohio. Catalog describes National data processing machines. (84)

North American Philips Co., Inc., 230 Duffy Ave., Hicksville, L. I., N. Y. Illustrated brochure on company's dictating and transcribing machine. (85)

Olivetti Corp. of America, 375 Park Ave., New York 22. Literature on the Divisumma 24 high speed calculator with memory. (86)

Ozalid Div. of General Aniline & Film Corp., Dept. AA-10, Johnson City, N. Y. Complete details on Ozalid "Instant-Copying" for purchase receiving. (87)

Peerless Photo Products, Inc., Shoreham, N. Y. A pamphlet describes the various office copying processes available. (88)

Radio Corp. of America, Blg. 15-1, Camden, N. J. Full color brochure describes Instant Call electronic intercom. (89)

Recordak Corp., 415 Madison Ave., New York 17. A 6-page brochure describes the Recordak portable microfilmer. (90)

Remington Rand Div. of Sperry Rand Corp., Room 2022, 315 Park Ave. South, New York 10. Folder R8964 gives full information on electric typewriters and interchangeable type. (91)

Royal McBee Corp., Data Processing Div., Port Chester, N. Y. Brochure S-500 describes Automatic Keysort Data Processing. (92)

Scribe Distributors Co., 6949 W. North Ave., Oak Park, Ill. *Remote Dictation Systems* presents diagrams and examples of applications and installations. (93)

The Shredmaster Corp., Holland Plaza Bldg., 75 Varick St., New York 13. Circular 70 gives full details on Shredmaster Bantam 10. (94)

Scriptomatic, Inc., 316 N. 11th St., Philadelphia 7. Full color brochure on Model 101-S Scriptomatic Addressing machine. (95)

Smith-Corona Marchant, Inc., 701 E. Washington St., Syracuse 1, N. Y. *Tips to Typists*, a booklet of valuable suggestions. (96)

Standard Duplicating Machines Corp., Everett 49, Mass. Brochure describes duplicators with electronic feed. (97)

Teletype Corporation, 4100 West Fullerton Ave., Chicago 39, Ill. Literature on Teletype Model 28 data communications equipment. (98)

Times Facsimile Corp., 540 W. 58th St., New York 19. Brochure describes the Stenafax method of making mimeograph, offset, and hectograph masters. (99)

Thomas Collator Industries, Inc., Dept. E4, 100 Church St., New York, N. Y. Complete details and prices on the Rotomatic. (100)

Underwood Corp., One Park Ave., New York 16. Catalog shows complete line of company's office machines and supplies. (101)

Acme Visible Records, Inc., Crozet, Va. Booklet entitled, *How to Save Time.* (102)

American Institute of CPA's, 270 Madison Ave., New York 16. 1960 catalog on accounting, taxation, and related subjects. (103)

Bankers Box Co., 2607 N. 25th Ave., Franklin Park, Ill. *Economical Record Storage Equipment for Today's Business Needs.* (104)

Beekley Corp., Data Systems Div., West Hartford, Conn. Catalog shows applications of Needle/Sort. (105)

Bogen-Presto, P.O. Box, Paramus, N. J. Catalog depicts company's complete line of office intercoms. (106)

Chart-Pak, Inc., 2 River Rd., Leeds, Mass. Catalog shows the use of pressure sensitive materials in making office layouts. (107)

Dejur-Amsco Corp., 45-01 Northern Blvd., Long Island City, N. Y. *How to Measure Time With Tape,* an instructive booklet on magnetic tape dictating machines. (108)

The Denominator Co., Inc., 261 Broadway, New York 7. Case studies available showing various uses of manual tabulators. (109)

E. I. Du Pont de Nemours & Co., Inc., Film Dept., Wilmington 98, Del. List of stationary supplies made with Du Pont Mylar polyester film. (110)

Eastern Fine Paper and Pulp Div., Standard Packaging Corp., Bangor, Maine. Booklet shows sample bond paper in white and 13 colors. (111)

The Gevaert Co. of America, Inc., 321 W. 54th St., New York 19. Folder describes procedure for making contact or camera speed, aluminum offset plates; specify. (112)

Hamilton Specialties, Inc., 148 Old Colony Ave., Wollaston 70, Mass. Brochures on postal scales and metal office accessories. (113)

A. P. Heinz Co., 2422 Lunt Ave., Chicago 45. Booklet presents a simplified form of paper gathering based on motion study. (114)

Allen Hollander Co., Inc., 385 Gerard Ave., New York 51. "Automation / Labelation" presents uses for labels in data processing. (115)

Hygienic Dental Mfg. Co., 1245 Home Ave., Akron, Ohio. Color brochure depicts decorative foot comfort cushions. (116)

Indiana Cash Drawer Co., P.O. Box 236, Shelbyville, Ind. Brochure describes cash drawers. (117)

Marney Sales and Mfg. Co., 41 E. 42nd St., New York 17. Brochure illustrates a table especially designed for photocopy and duplicating machines. (118)

Microfilming Corp., of America, 2 Llewellyn Ave., Hawthorne, N. J. *Considering a Microfilming Program* is an illustrated brochure of services offered by company. (119)

Minnesota Mining and Manufacturing Co., 900 Bush Ave., St. Paul 6, Minn. 12-page booklet, *Better Business Communications,* describes advantages of electric copying machines. (120)

P. O. Moore, Inc., Glen Riddle, Pa. Control systems, cabinets, and accessories for handling keys. (121)

Mosler Safe Co., 320 Fifth Ave., New York 1. Catalog suggests the proper usage of various types of filing equipment. (122)

The Multistamp Co., P.O. Box 1249 Norfold 1, Va. Catalog describes company's products and methods of marking for shipping. (123)

National Blank Book Co., Holyoke, Mass. Folder #308 RI depicts latest design in data processing binders. (124)

National Data Processing Corp., Box 122, Dallas 21, Texas. Literature on high-speed document reading, sorting, and data converting equipment. (125)

Oxford Filing Supply Co., Inc., Clinton Road, Garden City, N. Y. Catalog #60 contains complete list of supplies, systems, and equipment. (126)

Pitney-Bowes, Inc., 2950 Walnut St., Stamford, Conn. Booklet on cutting postage costs describes accuracy test for your present mailing system. (127)

Royal McBee Corp., Data Processing Div., Port Chester, N. Y. Complete description of company's punched-card system, *The Automatic Keysort System.* (128)

Smith Metal Arts Co., Inc., 1721 Elmwood, Buffalo, N. Y. Catalog gives price list on all open stock metal desk accessories. (129)

Stromberg-Carlson, Special Products Div., 1400 N. Goodman St., Rochester 3, N. Y. Booklet describes private internal telephone communications system. (130)

United States Rubber Co., Coated Fabrics & Koylon Seating Dept., 407 N. Main St., Mishawaka, Ind. Booklets on general products. (131)

Zephyr American Corp., 95 Morton St., New York 14. Catalog describes desk-top rotary and semi-rotary card files. (132)

MISCELLANEOUS

Allied Carbon & Ribbon Mfg. Corp., 165 Duane St., New York 13. Brochure describes Duralon, synthetic ribbon fabric. (133)

Azrock Floor Products, P.O. Box 531, San Antonio 6, Texas. Catalog shows line of vinyl asbestos and asphalt resilient floor tile. (134)

The Baltimore Business Forms Co., 3134 Frederick Ave., Baltimore 29, Md. *Successful Operations,* presents time-saving systems for selling, shipping, and billing. (135)

The Dobeckmun Co., P.O. Box 6417, Cleveland, Ohio. Brochure describes reinforced tapes and punch card stock. (136)

Dresser Products, Inc., P.O. Box 2035, Providence 5, R. I. Catalog describes punched tape accessories and supplies. (137)

The Eraser Co., Inc., 1068 S. Clinton St., Syracuse 4, N. Y. Literature depicts eraser for general office use. (138)

Ever Ready Calendar Mfg. Co., 150 Bay St., Jersey City 3, N. J. 50th Anniversary catalog. (139)

General Pencil Co., 67 Fleet St., Jersey City 6, N. J. Brochure on writing tools. (140)

Gowdy Office Materials Co., 113-117 Ontario St., Toledo 2, Ohio. Brochure with samples of Kolated copy sets. (141)

The Gray Mfg. Co., 16 Arbor St., Hartford 1, Conn. Booklet describes the battery-operated Key-Noter dictating machine. (142)

Heyer Inc., 1850 S. Kostner Ave., Chicago 23, Ill. Catalog #59 depicts company's line of duplicators and supplies. (143)

Walter G. Legge Co., Inc., 101 Park Ave., New York 17. Catalog describes floor maintenance supplies. (144)

Lindy Pen Co., Inc., Box 232 Culver City, Cal. Full color catalog of ball point pens contains prices and order blanks. (145)

Minnesota Mining and Mfg. Co., 900 Bush Ave., St. Paul 6, Minn. 28-page booklet describes Scotch Brand tapes and dispensers for general office usage. (146)

Nekoosa-Edwards Paper Co., Port Edwards, Wis., Instruction booklets for mimeo and duplicating machines. (147)

Pitney-Bowes, Inc., 2951 Walnut St., Stamford, Conn. Booklet suggests method of cutting costs of imprinting paper. (148)

Rogersnap Business Forms, Inc., 4924 Reading St., Dallas, Texas. Literature on printed business forms and systems. (149)

C. E. Sheppard Div., Yawman & Erbe Mfg. Co., Inc., Rochester 3, N. Y. Catalog B depicts sectional post and sundry binders. Prices also given. (150)

Charles C. Smith, Inc., Exeter, Neb. Catalog shows Smith-Index tabs and filing supplies. (151)

Standard Stationery Supply Co., 1020 S. Wabash Ave., Chicago 5, Ill. A 384-page catalog listing office supplies. (152)

Stock Forms Co., 491 S. Dean St., Englewood, N. J. Speedicopy sample kit for loose and padded carbon interleaved second sample sheets. (153)

X-Acto, Inc., 48-41 Van Dam St., Long Island City 1, N. Y. Catalog of interchangeable-blade knives for office use. (154)

If you wish any of the items listed in this section, you may request them by using this coupon. The numbers on the coupon correspond to the numbers of the items in the preceding list. Merely check the numbers of the items you wish and forward the coupon to Office Management.

OFFICE MANAGEMENT
212 Fifth Ave., New York 10, N. Y.

Please send the literature indicated by the numbers checked on this coupon.

☐ 1	☐ 24	☐ 47	☐ 70	☐ 93	☐ 124
☐ 2	☐ 25	☐ 48	☐ 71	☐ 94	☐ 125
☐ 3	☐ 26	☐ 49	☐ 72	☐ 95	☐ 126
☐ 4	☐ 27	☐ 50	☐ 73	☐ 96	☐ 127
☐ 5	☐ 28	☐ 51	☐ 74	☐ 97	☐ 128
☐ 6	☐ 29	☐ 52	☐ 75	☐ 98	☐ 129
☐ 7	☐ 30	☐ 53	☐ 76	☐ 99	☐ 130
☐ 8	☐ 31	☐ 54	☐ 77	☐ 100	☐ 131
☐ 9	☐ 32	☐ 55	☐ 78	☐ 101	☐ 132
☐ 10	☐ 33	☐ 56	☐ 79	☐ 102	☐ 133
☐ 11	☐ 34	☐ 57	☐ 80	☐ 103	☐ 134
☐ 12	☐ 35	☐ 58	☐ 81	☐ 104	☐ 135
☐ 13	☐ 36	☐ 59	☐ 82	☐ 105	☐ 136
☐ 14	☐ 37	☐ 60	☐ 83	☐ 106	☐ 137
☐ 15	☐ 38	☐ 61	☐ 84	☐ 107	☐ 138
☐ 16	☐ 39	☐ 62	☐ 85	☐ 108	☐ 139
☐ 17	☐ 40	☐ 63	☐ 86	☐ 109	☐ 140
☐ 18	☐ 41	☐ 64	☐ 87	☐ 110	☐ 141
☐ 19	☐ 42	☐ 65	☐ 88	☐ 111	☐ 142
☐ 20	☐ 43	☐ 66	☐ 89	☐ 112	☐ 143
☐ 21	☐ 44	☐ 67	☐ 90	☐ 113	☐ 144
☐ 22	☐ 45	☐ 68	☐ 91	☐ 114	☐ 145
☐ 23	☐ 46	☐ 69	☐ 92	☐ 115	☐ 146
				☐ 116	☐ 147
				☐ 117	☐ 148
				☐ 118	☐ 149
				☐ 119	☐ 150
				☐ 120	☐ 151
				☐ 121	☐ 152
				☐ 122	☐ 153
				☐ 123	☐ 154

Name ..... Title ..... Company .....

Address ..... City ..... Zone .....

Associations of interest to office management

American Bankers Association
12 E. 36 St., New York 16.

American Institute of Certified Public Accountants
270 Madison Ave., New York 16.

American Institute of Electrical Engineers
33 W. 39 St., New York 18.

American Institute of Management, Inc.
125 E. 38 St., New York 16.

American Management Association
1515 Broadway, New York 36.

American Personnel and Guidance Association
5040 Grace Ave., St. Louis 16.

American Records Management Association
President: Mrs. Ida Welch, Allen-Bradley Co., 136 W. Greenfield Ave., Milwaukee, Wisc.

American Society for Personnel Administration
P.O. Box 447, Madison Square Station, New York 10.

Association for Computing Machinery
2 E. 63 St., New York 21.

Association of Consulting Management Engineers, Inc.
347 Madison Ave., New York 17.

Association of Records Executives and Administrators
President: Norman L. Gullifer, New Jersey Bell Telephone Co., 540 Broad St., Newark 1, N. J.

Business Forms Institute
350 Fifth Ave., New York 1.

Controllers Institute of America
2 Park Ave., New York 16.

Federal Government Accountants Association
45 Broadway, New York 6.

Industrial Management Society
Suite 1310, 330 S. Wells St., Chicago 6.

Institute of Radio Engineers, Inc.
1 E. 79 St., New York 21.

Instrument Society of America
313 Sixth Ave., Pittsburgh 22.

Insurance Accounting and Statistical Association
President: Charles Andrew, Jefferson Standard Life Insurance Co., Greensboro, N. C.

Life Office Management Association
110 E. 42 St., New York 17.

Management Development Center
California Institute of Technology Pasadena, Cal.

National Association of Manufacturers
2 E. 48 St., New York 17.

National Association of Purchasing Agents
11 Park Place, New York 7.

National Association of Suggestion Systems
25 E. Jackson Blvd., Chicago 4.

National Business Forms Associates
207 E. Broward Blvd., Fort Lauderdale, Fla.

National Industrial Conference Board, Inc.
460 Park Ave., New York 22.

National Institute of Governmental Purchasing, Inc.
1001 Connecticut Ave., N.W., Washington 6, D. C.

National Machine Accountants Association
208 S. Main St., Paris, Ill.

National Management Association
321 W. First St., Dayton 2, Ohio.

National Microfilm Association
P.O. Box 386, Annapolis, Md.

National Office Management Association
Willow Grove, Pa.

National Records Management Council, Inc.
555 Fifth Ave., New York 17.

National Secretaries Association (International)
222 W. Eleventh St., Kansas City 5, Mo.

Newspaper Personnel Relations Association
President: William Forrester, The Pittsburgh Press, Pittsburgh 30.

Office Equipment Manufacturers Institute
777 14 St. N.W., Washington, D.C.

Office Equipment Manufacturers Exhibits, Inc.
777 14 St. N.W., Washington, D.C.

Office Executives Association of New York, Inc.
530 Fifth Ave., New York 36.

Office Management Association of Chicago
105 W. Madison St., Chicago 2.

Railways Systems and Procedures Association
433 Grand Central Station, Chicago 7.

Record-Controls, Inc.
209 LaSalle St., Chicago 4.

Records Management Association of Chicago
President: Mrs. Doris Hughes, Remington Rand Div. Sperry Rand Corp., 444 N. Michigan Ave., Chicago 5.

Records Management Association of New York
President: Theresa M. Burke, Burke Employment Agency, 130 W. 42 St., New York 36.

Safe Manufacturers National Association, Inc.
366 Madison Ave., New York 17.

Society for Advancement of Management, Inc.
74 Fifth Ave., New York 11.

Systems and Procedures Association of America
4463 Penobscot Bldg., Detroit 26.

The Institute of Management Sciences
250 North St., White Plains, N. Y.

Wood Office Furniture Institute
1414 Eye St., Washington 1, D. C.

Preview of events during 1960

ACME Semi-Annual Meeting. New York. January 25.
Sponsor: Association of Consulting Management Engineers.
Place: University Club.

AIM Correspondence Seminar "Management and Finance." Starting January — 12 monthly installments.
Sponsor: American Institute of Management, Inc., 125 E. 38 St., New York 16.

ISA Automation Conference and Exhibit. Houston, Texas, February 1-4.
Sponsor: Instrument Society of America.
Place: Rice Hotel and Sam Houston Coliseum.

UUA Semi-Annual Conference, White Sulphur Springs, West Virginia. February 25-26.
Sponsor: Univac Users Association.
Place: Greenbrier Hotel.

CIA Southern Regional Conference. Edgewater Park, Mississippi, February 25-27.
Sponsor: Controllers Institute of America.
Place: Edgewater Gulf Hotel.

AMA Electronics Conference. New York, February 29- March 2.
Sponsor: American Management Association.
Place: Statler Hotel.

OMAC Business Show and Seminar. Chicago, February 29-March 3.
Sponsor: Office Management Association of Chicago.
Place: Conrad Hilton Hotel.

NOFA Conference and Exhibit. Atlantic City, March 11-13.
Sponsor: National Office Furniture Association.
Place: Chalfonte-Haddon Hall.

NMAA Northeastern Divisional Data Processing and Computer Conference.
Sponsor: National Machine Accountants Association.
Place: Statler-Hilton Hotel.

LOMA Debit Insurance Forum. New Orleans, March 28-30.
Sponsor: Life Office Management Association.
Place: St. Charles Hotel.

Southern California Business Show. Los Angeles, Mar. 29-Apr. 1.
Place: Ambassador Hotel.

RSPA Spring Meeting. Chicago, April 5-8.
Sponsor: Railway Systems and Procedures Association.
Place: Morrison Hotel.

NICB 8th Annual Atomic Energy Conference. New York, April 6-8.
Sponsor: National Industrial Conference Board, Inc.
Place: Waldorf-Astoria.

AREA Annual Records Management Conference (exact date to be announced).
Sponsor: Association of Records Executives and Administrators.
Place: To be announced.

Western Joint Computer Conference. San Francisco, May 3-5. (Further details to be announced.)

CIA Eastern Regional Conference. Pocono Manor, Pennsylvania, May 8-10.
Sponsor: Controllers Institute of America.
Place: Pocono Manor Hotel.

ISA Instrument-Automation Conference and Exhibit. San Francisco, May 9-12.
Sponsor: Instrument Society of America.
Place: Civic Auditorium and Brooks Hall.

ASPA 12th Annual Conference. New York, May 15-18.
Sponsor: American Society for Personnel Administration.
Place: Statler Hilton Hotel.

NIASA 38th Conference and Business Show. Chicago, May 15-18.
Sponsor: Insurance Accounting and Statistical Association.
Place: The Sherman Hotel.

NSBB Annual Conference. Cincinnati, May 19-20.
Sponsor: National Society for Business Budgeting.
Place: Netherland Hilton Hotel.

CIA North Central Regional Conference. Louisville, Kentucky, May 22-24.
Sponsor: Controllers Institute of America.
Place: Kentucky Hotel.

NAPA Convention and Show. Los Angeles, May 22-25.
Sponsor: National Association of Purchasing Agents.
Place: To be announced.

NOMA International Conference and Office Exposition. Montreal, May 22-26.
Sponsor: National Office Management Association.
Place: Queen Elizabeth Hotel and the Montreal Show Mart.

FGAA Annual Exposition and Meeting. New York, May 23, 24.
Sponsor: Federal Government Accountants Association Exposition.
Place: Statler Hilton Hotel.

NPRA Annual Conference. New Orleans, May 25-28.
Sponsor: Newspaper Personnel Relations Association.
Place: Hotel Roosevelt.

Third Canadian National Business Show. Toronto, June 6-8.
Sponsor: Canadian Business Equipment Manufacturers Association.
Place: Exhibition Park.

CIA Midwestern Regional Conference. Milwaukee, June 9-11.
Sponsor: Controllers Institute of America.
Place: Hotel Schroeder.

IIA Conference. Milwaukee, June 12-15.
Sponsor: Institute of Internal Auditors.
Place: Hotel Schroeder.

CIA Northeastern Regional Conference. Montreal, June 16-18.
Sponsor: Controllers Institute of America.
Place: Queen Elizabeth Hotel.

NAA Conference. New Orleans, June 19-22.
Sponsor: National Association of Accountants.
Place: Hotel Roosevelt.

NMAA National Conference and Business Show. San Francisco, June 22-24.
Sponsor: National Machine Accountants Association.
Place: Mark Hopkins and Fairmont Hotels. Exhibit Hall, California Masonic Memorial Temple.

RSPA Records Management Meeting. Chicago, July 26-28.
Sponsor: Railway Systems and Procedures Association.
Place: Morrison Hotel.

ACM National Meeting. Milwaukee, August 23-25.
Sponsor: Association for Computing Machinery.
Place: Marquette University.

NSPA Conference. Kansas City, Mo., August 22-26.
Sponsor: National Society of Public Accountants.
Place: Muehlebach Hotel.

NBFA Conference. St. Louis, September 14-17.
Sponsor: National Business Forms Associates.
Place: Chase Park-Plaza Hotel.

NSOEA Annual Conference and Exhibit. Chicago, September 24-28.
Sponsor: National Stationery & Office Equipment Association.
Place: Conrad Hilton Hotel.

LOMA Annual Conference, Toronto, September 26-28.
Sponsor: Life Office Management Association.
Place: Royal York Hotel.

AICPA Annual Meeting. Philadelphia, September 25-28.
Sponsor: American Institute of Certified Public Accountants.
Place: Bellevue-Stratford and Sheraton Hotels.

ISA 15th Annual Meeting. New York, September 26-30.
Sponsor: Instrument Society of America.
Place: New York Coliseum.

ACME Meeting. Hot Springs, Va., September 29-October 2.
Sponsor: Association of Consulting Management Engineers.
Place: The Homestead.

NABACO Conference. Los Angeles, October 10-12.
Sponsor: National Association for Bank Audit, Control and Operation.
Place: Statler-Hilton Hotel.

SPAA Conference, New York, October 10-14.
Sponsor: Systems and Procedures Association of America.
Place: Commodore Hotel.

TIMS 7th Annual International Meeting, New York, October 20-22.
Sponsor: The Institute of Management Sciences.
Place: Henry Hudson Hotel.

CIA Annual National Conference. San Francisco, October 22-26.
Sponsor: Controllers Institute of America.
Place: Hotel Fairmont.

NIGP Conference, Washington, D. C., October 23-26.
Sponsor: National Institute of Governmental Purchasing Agents.
Place: Shoreham Hotel.

OEA National Business Show, New York, October 24-28.
Sponsor: Office Executives Association.
Place: New York Coliseum.

NASS 18th Annual Convention. Philadelphia, October 30-31.
Sponsor: National Association of Suggestion Systems.
Place: Sheraton Hotel.

OEMI Business Equipment Exposition. Los Angeles, November 1-4.
Sponsor: Office Equipment Manufacturers Exhibits, Inc.
Place: Los Angeles Memorial Sports Arena.

NICB General Session. Pittsburgh, November 17.
Sponsor: National Industrial Conference Board, Inc.
Place: Penn-Sheraton Hotel.

NAM Annual Meeting. (Exact date to be announced.)
Sponsor: National Association of Manufacturers.
Place: To be announced.

Office planning–

(*From page 57*)

immediate future. This can be a mistake. In our long experience, five years after the move all but a few companies have outgrown their new quarters. It is therefore becoming more important in planning to see that departmental moves are possible and that allowances are made for expansion.

The employee's morale has become a dominant factor in office planning during the past ten years. This has led to management's adopting many special facilities which have proved their value by paying off in greater efficiency as well as morale.

Company restaurants are being designed that are equal to, or better than, a first quality commercial restaurant. They are no longer remote areas that look almost the same as general office space except for the furniture.

Soft lighting, color, decoration, comfortable furnishings, attached lounges, and recreational areas are the trend. Also, where there is a choice, such facilities are being located away from the office areas. It makes the meal time more of a real break to actually go somewhere rather than just down the hall. It may be a subtle point—but subtle points often make the difference between an acceptable plan . . . and a plan that is outstanding!

Executive dining areas vary considerably, but we find most companies handle this as a special condition. Some may be limited to only officers and directors, with a relatively small area having its own kitchen. But more often, the same kitchen serves all dining, with the executive dining facilities so arranged that the luncheon period can play an important part in the executives' business day.

Few planning projects of any size today do not have a medical facility. True, some are minimum, but others are very extensive, and the trend shows that management is giving more thought and allotting more money to this item.

In programming many of our recent projects we are finding that management puts much emphasis on training facilities. For a group of any size, such facilities use about

every detail of planning you find in a large office project. Flexibility for quick division of space, traffic control, air-conditioning refinements, acoustical control, rest rooms, electronics, audio-visual, storage and special furniture are all factors which must be considered. A great deal of special planning and design must be devoted to these factors by both the company and the office architect.

Where facilities are available, management has expanded its training programs at every level. For instance, the many training rooms in both Socony and Seagram are so in demand that schedules are often filled far in advance of the date of use.

Better area control

The executive area has always been and always will be a special area, but there is an unmistakable trend in planning and equipping it. First, it is the rule rather than the exception that the "man at the top" is well aware that many executives are constantly shifting, and thus, personal idiosyncrasies in design are kept to a minimum, or planned so they can be easily converted.

At all times, the planning is directed toward efficient working. Thus, you will find a work area with the furniture designed and equipped to permit the user to carry on his work easily. Desks are appearing with a greater number of controls — rheostats for light control, numerous means of communication and recording, projection equipment for charts and other data, closed circuit television viewing.

In contrast to this work section, there is the quieter, more relaxed area in his office. Here, the mood is different, the lighting subdued, colors and furnishings in keeping with the change in pace. Fine art is often present in painting or sculpture. Secondary conference areas in the open are well received. These result in shorter interviews by permitting the executive to interview outside his office.

In many instances, the general executive area is being designed to permit large gatherings, for entertainment or meetings. "Walls" are being designed which have all the properties and appearances of permanent walls but permit the space to be opened to fit the occasion.

The Board Room is taking on the role of a multi-purpose area, which is a most natural trend because of its size, conveniences, and the variety of equipment required. There is far too great an investment, and far too many valuable uses for it today, to allow it to be used only occasionally. Here again, flexibility through wall treatment and seating accommodations is the general order. Audio-visual, recording, motion-picture, electronic, and display equipment are becoming as important as the board table. Board rooms are expensive, but worth it if used to full potential—and management realizes this.

Much has already been said elsewhere of open areas versus partitioned areas. Companies are well aware of what space can be gained by placing in the open, or in a cubicle, a man who previously had a partitioned office.

If a trend can be detected, it is back to more private offices in the *final plan* than were shown in the preliminaries. But these private offices are smaller than was the practice in years past. The number of interior offices is increasing due to the demand for more partitioned offices in the later development of plans.

Interiors more decorative

With smaller offices and interior offices, a great deal of their relative success depends on their treatment. Large areas of glass take over where formerly there were solid panels. Decorative treatment, luminous ceilings, lighted walls — all play a part in giving attractiveness to these offices. When there are interior offices, the air-conditioning distribution and controls for each space must be more refined in performance than would be the case if the same area were open space. The same applies to lighting, while the control of noise becomes a critical item demanding careful study.

Furniture, in type, size, layout, and accessories must be carefully planned and chosen to function efficiently in the limited space that is the rule today. In the past, many such offices were used for four- to five-man conferences with the occupant. But much area is gained with more flexibility by planning smaller offices and a few scattered conference rooms that can be used by many.

For many years, movable partitions meant large solid panels. Today, there are numerous choices consisting of a frame, and a filler suited to the designer's own choice. This may be full height glass, wood panelling, fabric-covered panels, plastic, cork, or enameled metal. The finishes can be permanent or they can be changeable.

The erection of partitions is being constantly improved with snap-in features at the floor, the ceiling, and between the frames. The installation of electrical services has been simplified. In spite of all this, the *special* conditions which have to be met in every project I know are the most troublesome factors.

Probably the greatest change in the acoustical picture is the growing awareness of the problem during the past few years. Today, with buildings sealed for air-conditioning, little outside noise is present. Therefore, relatively low level interior noises produced by typewriters and conversation can become annoying.

There is a general misconception that an acoustical ceiling is all that is needed for soundproofing. In actuality, such a ceiling does little except absorb sound produced in the space directly underneath. Such absorption merely stops sounds from reverberating within the space, but they go right through into the next space. Also, where one acoustical material might perform well on one type of sound, it is completely ineffectual with another type—and all types of sound are present to some degree.

In line with the "open space" approach to planning, partial height partitions may give some visual privacy but practically no acoustical protection. Absorbent material alone will not give it—this is only for control within a space. It takes a barrier of mass and weight to keep out the external sounds, or to confine noise within a space. Flexibility poses a

but there is an unmistakable trend in planning and equipping it."

real problem. Offices want the desirable feature of easy relocation of partitions. Yet at the same time, good acoustical control requires treatment in some manner of the space above the ceiling where the movable partitions stop.

The practice today is to set standards of performance, design, and construction — depending on the need in each area—and then make sure that the occupant understands the limits of such standards. Then he must live with them. The large lighting areas in ceilings not only reduce the area for ceiling sound treatment but result in what in reality are holes punched through to the air space above. This problem is being partially met by use of plastic material for light diffusion. This not only offers good light transmission but also has definite acoustical properties.

If any one thing could be singled out as the most significant trend in lighting during the fifties, it probably would be the trend to higher light levels. At first thought one's reaction may be why do we need it? But when you look at the history of lighting you have probably personally been involved as a user of a light level that has gone from 20 foot candles up to 50—and today the level is fast moving to somewhere between 50 and 100 foot candles. The history of lighting substantiates this projection. The upward trend has never faltered from the beginning, yet at every point along the way it was thought the new standard was the ultimate, or close to it.

That higher light levels pay off has been proven by controlled tests. In three different government bureaus, the production efficiencies improved 3½ per cent, 5½ per cent and 8 per cent respectively when light levels were tested. And when it is considered that to provide light of one foot candle in 1906 cost 7 per cent of the users' wages while today 200 foot candles cost 3½ per cent of the users' wages — and with proven efficiencies, it can be well imagined that the cost element will not hinder management from continuing to improve lighting standards.

The matter of heat at these higher levels is a problem, but studies are well along that promise means to draw off this heat, thus minimizing what could be a tough air-conditioning problem.

You cannot have comfortable higher light levels without special attention to glare. This is being handled in several ways—such as use of low brightness diffusing material in regular type fixtures—or designing the entire ceiling as a source of light. As mentioned earlier, a luminous ceiling is usually employed only under special conditions, but it is appearing more and more.

Less glare with luminous ceiling

When the entire ceiling serves as a lighting panel, 100 foot candles does not seem as bright to the eye as a series of glaring plastic light fixtures giving 30 foot candles. In its own way it represents the same principle as a big balloon tire which needs only a ten pound pressure to hold up the same load as a small tire which might need seventy-five pounds pressure.

But light is being used for more today than just to put a given number of foot candles of illumination on a desk top. It is being used to give visual interest to areas where formerly little thought was given to such refinements. In the ceiling itself, the imaginative handling of light by type, source, location, clustering, and patterned arrangement, is taking it out of the strictly utilitarian class, and making it a most important element of the design. And recessed incandescent light for special areas is getting a bigger play than ever.

With good mechanical design, air-conditioning, and proper lighting, practically all limitations of interior space are removed as far as location of workers is concerned. With the great amount of interior space being used for working areas in most of today's buildings this is most important, but the psychological barrier against windowless space always must be faced. Color is one of the most useful tools to overcome this, and it is not limited by structural or mechanical conditions. As such, the various roles color plays in the entire picture are carefully studied. Quiet conservative backgrounds may be pepped up by spots of exciting colors, strategically located. More vivid color combinations do much to create a mood, provide interest, and yet can be utilitarian at the same time.

Remember, though, that careful attention must be given to intensities of color because the occupant of a work space is viewing it hours on end, day after day, and what may appear exciting to a casual visitor who views it briefly and leaves, can become irritating to the occupant.

Methods now in use for carrying electric power to the various floors of an office building permit great flexibility in meeting large demands. This is a base building item, but the building's power facilities should be carefully checked for an office project which might call for a large electrical load in the future. How high the electric load will go during the life of a long lease is anybody's guess, and it is difficult to plan for it other than to be as sure as practical that if demand increases during the next 20 years as it has in the past 20, additional services can be easily installed. A good system of well considered under-floor electrical ducts will best serve the function of flexibility over the years. Since the company is in there for years—and there will be changes, the long range view is the one to take.

Secret of maximum utility

The initial location of these ducts, if thoughtfully planned will reflect savings in every future move. The secret of getting maximum use and convenience from such a network, we have found, lies in the frequency of terminal boxes and runs back to the electric panels.

Sometimes it is rather hard to resist the temptation to sound like Buck Rogers when talking about the next ten years. We prefer to stick pretty close to developments that are already under way which will become more and more prevalent during the sixties.

Automation and the continuing great strides in business machine development are making it inevitable that office layout will continue to change over the years. The sixties will see more and more built-in

mechanical equipment replacing human workers, which will continually change environmental conditions as well as heat loads and electrical requirements.

Lighting, and the use of light will play a most important part in Tomorrow's Office. Whereas today most lighting stems from individual points or areas in the ceiling, Tomorrow's Office will have lighted walls in many instances. In some, these will act as prime light sources, the surface material glowing. In others, the wall will give off reflected light to reduce eye fatigue by removing shadows and areas of strong contrast.

The individual will still be the most important factor in offices, regardless of automation or mechanization, so planning will be carried on with two governing factors, equal in importance. One, the maximum efficiency of the operation, and the other, the comfort, pleasure, and pride of the employee.

VOGEL-PETERSON

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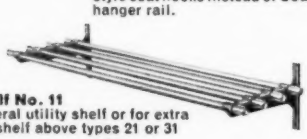
Write for Bulletin DL 61

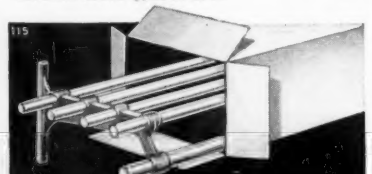
3 BASIC SHELVES

Shelf No. 21 has full length Hanger Rail extending 11-5/8" from wall.

Shelf No. 31 has staggered, die cast, anchor-style coat hooks instead of Coat hanger rail.



Shelf No. 11 general utility shelf or for extra hat shelf above types 21 or 31



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Office interiors—

(*From page* 66)

the partition change and new layout. As a result, just as the movable partition replaced the plaster wall (when it's moved, the plaster wall disintegrates into just so much plaster dust and cannot be salvaged), instead of the conventional plaster ceiling, we began to see many types of mechanically suspended and erected acoustical ceilings. Similarly, flexible air conditioning ducts were developed which could be moved in many directions above the ceiling to satisfy the same "change" need.

The concepts of flexibility inherent in these developments were, I believe, first utilized by our company as fundamental in the planning of offices. And with this kind of flexibility, reconstruction costs, as well as work interruption, were minimized.

Since our company was dedicated to the concept of flexibility, we were still dissatisfied. While these methods were a vast improvement over anything that had gone before in making office layout changes, a certain portion of partitions would always find themselves out of commission when a change was made because they didn't fit into the new layout.

Our company had the opportunity to correct this in 1955 when a complex office planning job came along requiring an extraordinary degree of flexibility. To meet this situation, we developed a new concept based on an extension of the modular principle (the design and construction of all elements on the same module or given length) by which all panels as well as doors could be interchangeable with one another. This now meant that the entire product was 100 per cent salvageable and, therefore, reusable.

Furthermore, included in our partitioning development was the introduction of partition or panel inserts of many different kinds of materials other than the conventional steel and glass. We used cork and wood veneers, for instance, to add a new esthetic element in the office—one which was also highly functional. Cork, for example, could be used in such departments as advertising, styling and public relations where visual material and presentations have to be pinned up for review and study.

Finally, we incorporated into this new system a new kind of lighting—a luminous ceiling, with perforations that permitted us to utilize the one ceiling for three basic functions: lighting, acoustics and air conditioning. This meant that when a partition change was made, there was no longer the need to call in any specialized mechanics to move a ceiling in order to get to air conditioning ducts or to move acoustical equipment, etc. Thus, if movable components and elements were an improvement over fixed masonry walls, and also meant considerable time and money savings through the elimination of demolition processes, how much more improvement and more savings were there in elements that didn't even have to be moved in order to accommodate a partition change!

Infinite changes in layout

What was heralded in that development, we have now carried even further. Our company has developed a flexibility system whereby infinite changes in layout can be made in any direction within a space without moving, touching or disturbing anything except for shifting a partition. And what's more, this partition shift can be done by anybody; it does not require any specialized crew. This system is currently being installed into the Time, Inc., project which involves some 400,000 square feet of space and 15 floors. I call this system "Flexibility through Inflexibility" and its value is instantly evident—nothing to move, nothing to pay for, nothing to disrupt. Yet at any

time, endless changeovers can be made.

I would predict that this type of flexibility or at least its concept will be one of the dominant developments picked up and utilized in the office of the coming 60's.

Along with the new development in flexibility, there are many others indicated for the decade ahead.

Clouds and rheostats

We will see lighting appear as flat luminous panels hung from ceilings, on walls, perhaps even sunk in floors—panels as thin as a sheet of glass and rheostatically controlled by devices that are attuned to natural lighting coming in from the outside. Thus, a cloud passing across the sun for even a few seconds will be accounted for in an automatic adjustment by the lighting system. And adjustments will be automatic, too, for different parts of the day, and for gloomy or bright days. This development will greatly decrease eye fatigue—without anyone even being aware of just what is at work for his or her comfort.

The sixties will also see a complete renovation in the entire thinking about acoustics. Former concepts will be thrown to the winds as it were, replaced by devices that will automatically compensate for any changes — in use, function or number of occupants — in a room. Thus a conference room, which today is usually acoustically designed for many people often has sound effects like those of a hushed cave. It can also be very physically trying on throat and voice when, say, only two people are in it. In the period ahead, acoustical controls will automatically adjust to the number of users of the room.

Along these lines, in fact, there is currently under study a plan for an acoustical screen consisting of a slot in the ceiling which throws down a sound barrier, thereby creating a division of space without any physical partition. Think of what this will mean in large, open pool areas where it will be possible to drop around each person an invisible but highly effective screen of auditory privacy!

Automation, in the sixties, will enter into every phase of the office interior, making communications within and far outside the office possible in a matter of seconds, and, in general, demanding less energy of the worker, while at the same time increasing the overall efficiency of the office.

All of these elements geared to today's basic business requirements take in the "human side" of the office, too. There will continue to be emphasis on comfort, decoration and pleasant facilities for living and working. A particular stimulant toward this approach is the fact that women are a constantly increasing majority of the office labor force.

In other words, just as the fifties saw the introduction of a new kind of office with equipment and facilities that departed completely from the past, so we now enter into a period when advances may well be equally dramatic. But what would certainly seem to remain constant through the foreseeable future is the continued leadership of office activities in the nation's economy.

Furniture—

(*From page 73*)

uncomfortable employee is less productive, prone to make more mistakes—is, in short, a potential liability.

Consider this simple example of employee production. A new employee was given a simple work station equipped to handle routine correspondence and personal filing. The chair in which she swiveled to and fro, from typewriter to desk, was of the executive-type with a large back and arm rests. After two weeks on the job the worker could not function effectively. In the afternoon she grew drowsy and restless, which caused a 50 per cent decrease in her production over that of the morning. Four months later, by accident, the same employee worked at a desk equipped with a secretarial-type chair with a firm back support and no arm rests; she passed the entire afternoon actively and productively. The chair she initially received could not sustain her comfortably for more than four hours. The arms hampered her typing posture and working movements. An executive will hardly become excited about the replacement of a chair or work station, but he will undoubtedly beam when a superior efficiency report is received and the morale of his workers is high.

How, then, can one determine the best working facilities for each employee? An awareness of the individual employee and what he or she does during the working day is a good starting point. Had the employee mentioned above been given a suitable chair, her company might have reaped dividends immediately. A posture chair is not restricted to the executive office. It is designed to provide the body with the most comfortable sitting position and the best support possible. The American Standards Association has studied the problem of how to define a posture chair; it concluded that the chair should have three adjustments to accommodate the stature of the user. The seat must be adjustable in height and depth, and there must be a vertical adjustment of the backrest. Two other adjustments which may be found on the posture chair are found to be backrest pitch and spring tension. An ordinary "swivel" chair is one in which the back and seat form a single unit. The back of a posture chair can be adjusted horizontally and vertically, independent of the seat.

There is a belief that prices will be lower if you deal directly with the manufacturer. Reputable manufacturers (by reputable we mean those from whom you can expect a constant flow of excellence in produce, service, and representation) have a vast network of sales representatives or franchised dealers throughout the country on whom they depend for marketing and sales. It would be unreliable for the manufacturer to undermine this complex operation for one good-sized sale. It is often possible to buy directly from the manufacturer, but the price will generally remain constant with that of the dealer.

Of "deals" and "savings"

It is possible, too, to make a "deal" at a large savings, but offices that have done so have learned that this can be an extremely costly "savings." One firm heard of a warehouse that would give it 30 per cent off the actual list price. It hired a van and a small force of workmen to truck the desks to the office.

Some desks were damaged in transit, a few were missing functional parts, drawers failed to roll, and on half of the lot, the entire internal mechanisms (letter trays, file drawers, stationary pockets, etc.) were inappropriate. In this case, the company continued to pay on its "coup of 30 per cent" for years to come. The merchandise, it turned out, was not actually up to the fifteen-year existence designated by the planning department. The "coup of 30 per cent" is a tale often heard, the true meaning of which is not always understood. The old sales slogan, "you can't buy price, only quality," may turn out to be your best insurance.

The Manufacturers

The following list includes the principal manufacturers of office desks and chairs. The codes used to indicate the types of products offered are as follows:

CM—Metal chairs.
CMP—Metal chairs, posture type.
CW—Wood chairs, posture type.
DM—Metal desks, standard.
DMM—Metal desks, modular.
DW—Wood desks, standard.
DWM—Wood desks, modular.
MI—Miscellaneous.
NI—No information available on current products at press time.

The Acorn Co., 4605 W. 21 St., Chicago 50. (DM)

All-Steel Equipment, Inc., Griffith & Highland Ave., Aurora, Ill. (CM;CMP;DM;DMM)

Alma Desk Co., Drawer 271, High Point, N. C. (DW;DWM)

Anderson-Hickey, 915 Cherokee Ave., Nashville, Tenn. (CM;CMP; DM)

Ard Mfg. Co., Inc., 13 Vine St., Evansville, Ind. (MI)

Art Metal Construction Co., 41 E. 42 St., New York 17. (CM;CMP; DM)

Art Steel Co., Inc., 170 W. 233 St., New York 63. (CM;CMP;DM; DMM)

Automatic File & Index Co., 549 W. Washington Blvd., Chicago 6. (DM)

Barcalo Mfg. Co., 166 Chandler St., Buffalo 7, N. Y. (CW)

Barler Metal Products, Inc., 214 W. Jefferson St., Goshen, Ind. (DM)

BELA Div., J & J Tool Machine Co., 9505 S. Prairie Ave., Chicago 28. (MI-Folding chairs)

Bentson Mfg. Co., Aurora, Ill. (DM; DMM)

Berger Mfg. Div., Republic Steel Corp., 1038 Belden Ave., N.E., Canton 5, Ohio. (DM)

Berkey Leather Furniture Corp., 595 Broadway, New York. (NI)

Bernard Franklin Co., Bristol, Bath & Hedley Sts., Philadelphia 7, Pa. (NI)

Blair Aluminum Furniture Co., Inc., 106 Kennesaw Ave., Marietta, Ga. (NI)

Boling Chair Co., P. O. Box 312, Silver City, N. C. (CW;CWP)

Brewer-Titchener Corp., Cortland, N. Y. (MI-Folding chairs)

Brown-Morse Co., Muskegon, Mich. (CM;CMP;DM;DMM)

The Brunswick-Balke-Collender Co., 623 S. Wabash Ave., Chicago 5. (CMP;DM;DMM)

The Buckstaff Co., 1127 S. Main St., Oshkosh, Wis. (CW)

Carlton-Surrey, Inc., 1516 Baline S.E., Grand Rapids, Mich. (CW; DW;DWM)

Central Desk Mfg. Co., 454 N. Armour St., Chicago 22. (DW; DWM)

Challenger Steel Products Corp., 350 Morgan Ave., Brooklyn 6. N. Y. (DM)

Clarin Mfg. Co., 4640 W. Harrison St., Chicago 44. (CM-Including folding chairs)

Cole Steel Equipment Co., Inc., 415 Madison Ave., New York 17. (CM; CMP;DM;DMM)

Columbia-Hallowell Div., S.P.S., Highland Ave., Jenkintown, Pa. (CM;CMP;DM;DMM)

Cottonsmith Furniture Mfg. Co., Inc., Box 4628, Winston-Salem, N. C. (CW;CWP;DW;DWM)

Corry-Jamestown Mfg. Corp., Corry, Pa. (DM;DMM)

Cramer Posture Chair Co., 625 Adams St., Kansas City 5, Mo. (CM;CMP;DMM)

D & J Office Furniture Co., 61 W. Hubbard St., Chicago 10. (DM; DW;DWM)

Dependable Mfg. Co., 2407 Fort Crook Rd., Bellevue, Neb. (CM; CMP)

Designcraft Metal Mfg. Corp., 155 27th St., Brooklyn 32, N. Y. (DM; DMM)

Dixie Chrome Products, 711 E. First St., Irving, Tex. (CM;CMP;DM)

Domore Chair Co., Inc., 2400 Sterling Ave., Elkhart, Ind. (CM; CMP)

Doro Mfg. Co., 220 W. Institute Pl., Chicago 10. (DW;DWM)

Dorset Steel Equipment Co., 33-36 N. Broad St., Philadelphia 41. (DM;DMM)

Doten-Dunton Desk Co., 26 Otis St., East Cambridge 4, Mass. (CW; DW;DWM)

Dunbar Furniture Mfg. Co., Berne, Ind. (CW;CWP;DW;DWM)

Durable Metal Products Co., 38-42 Review Ave., Long Island City, N. Y. (DM)

Emeco Corp., Maple Ave. & High St., Hanover, Pa. (CM;CMP;CW)

Executive Furniture, Inc., 2800 Virginia St., Wichita Falls, Texas. (DW;DWM)

The Fritz-Cross Co., 330 E. 4th St., St. Paul, Minn. (CM;CMP)

Garrett Tubular Products, Inc., 802 E. King St., Garrett, Ind. (CMP; CM)

The General Fireproofing Co., Youngstown 1, Ohio. (CM;CMP; DM;DMM)

The Globe-Wernicke Co., Cincinnati 12, Ohio. (CM;CMP;DM;DMM)

Grand Rapids Leather Furniture Co., Inc., 209 Front Ave., N.W., Grand Rapids, Mich. (CW;CWP; DW)

W. H. Gunlocke Chair Co., Wayland, N. Y. (CW;CWP)

The H-O-N Co., Third & Oak Sts., Muscatine, Iowa. (DM;DMM)

Hamilton Cosco, Inc., 2525 State St., Columbus, Ind. (CM;CMP)

Hanes Chair & Furniture Co., Inc., Mocksville, Ind. (MI)

Harrison Steel Desk & File Co., 4718 W. Fifth Ave., Chicago 44. (DM)

The Harter Corp., 581 Prairie Ave., Sturgis, Mich. (CM;CMP)

Haskell, Inc., P. O. Box 5293, Pittsburgh 6, Pa. (DM;DMM)

Hillside Metal Products Co., 262-270 Passaic St., Newark 4, N. J. (DM;DMM)

Howe Folding Furniture Co., 1 Park Ave., New York 16. (MI-Folding furniture)

The Howell Co., 4295 S. First St., St. Charles, Ill. (CM)

Huntington Furniture Corp., 20 St. & Second Ave., Huntington 18, W. Va. (CW;DW)

Ideal School Supply Co., 8312 S. Berkhoff Ave., Chicago 20. (MI)

Imperial Desk Co., 1312 W. Florida St., Evansville 7, Ind. (CW;CWP; DW;DWM)

Indiana Chair Co., P. O. Box 70, Jasper, Ind. (CW;CWP)
Indiana Desk Co., 1201 N. Mill St., Jasper, Ind. (DW;DWM)
Invincible Metal Furniture Co., 26 Franklin St., Manitowoc, Wis. (CM;CMP;DM;DMM)
Jasper Chair Co., Jasper, Ind. (CW; CWP)
The Jasper Desk Co., Box 111, Jasper, Ind. (DW;DWM)
Jasper Office Furniture Co., 13 & View Sts., Jasper, Ind. (DW; DWM)
Jasper Seating Co., Inc., Jasper, Ind. (CW;CWP)
Jayem Sales Corp., 31 Coffey St., Brooklyn 31, N. Y. (CM;CW; DW)
The Johnson Chair Co., 7109 Merchandise Mart, Chicago 54. (CW; CWP)
King Posture Chair Co., 953 S. Raymond Ave., Pasadena 2, Calif. (CP)
Knoll Associates, Inc., 575 Madison Ave., New York. (CM;CW;DM; DW)
Korda Industries, 20 W. 46th St., New York 19. (DM)
Krueger Metal Products, Green Bay, Wis. (CM)
Lehigh Desk Co., 106 Duane St., New York. (DW)
Lehigh Furniture Corp., 16 E. 53rd St., New York 22. (CMP;CW; CWP;DW;DWM)
The Leopold Co., 914 Osborn St., Burlington, Iowa. (DW)
Lyon Metal Products, Inc., 528 Monroe Ave., Aurora, Ill. (DM)
Macey-Fowler, Inc., 305 E. 63rd St., New York 21. (CM;CMP;CW; CWP;DM;DMM;DW;DWM)
The B. L. Marble Chair Co., 89 Willis St., Bedford, Ohio. (CW; CWP)
Marden Mfg., Inc., 1015 N. Halsted St., Chicago 22. (CW;DW;DWM)
Rockaway Metal Products Corp., Marnay Sales Div., 41 E. 42nd St., New York 17. (DMM)
Metalstand Co., 7520 State, Philadelphia 26, Pa. (DM)
Herman Miller Furniture Co., Zeeland, Mich. (CW;CWP;DW; DWM)
Milwaukee Chair Co., 3022 W. Center St., Milwaukee 45. (CW; CWP)
Milwaukee Metal Furniture Co., 101 N. Campbell Ave., Chicago 12. (CM;CMP)
Modern Steelcraft, Inc., 2973 Cropsy, Brooklyn 14, N. Y. (DM)
Modernize, Inc., 666 Lake Shore Dr., Chicago 11. (MI)
Monarch Furniture Co., Inc., 803 Ward St., High Point, N. C. (CW; CWP)
The Mosler Safe Co., 320 Fifth Ave., New York 1, N. Y. (DMM)
Murphy-Miller, Inc., 2103 Bluff St., Owensboro, Ky. (CW;CWP; DWM)
Myrtle Desk Co., P. O. Box 1750, High Point, N. C. (DW)
Niagara Therapy Mfg. Corp., Adamsville, Pa. (C-With massage unit)
Norcor Mfg. Co., Inc., 666 Lake Shore Drive, Chicago. (CM)
Northwest Metal Products Co., 1337 E. Mason St., Green Bay, Wis. (CM;CMP;DM)
Nu-Craft Products Co., 321-327 Clarkson Ave., Brooklyn 26, N. Y. (MI)
Office Suites Inc., 21 West Illinois, Chicago, Ill. (NI)
Ohio Chair Co., Inc., 408 N. Meridian Rd., Youngstown, Ohio. (CM; CMP)
Orno-Metal, Inc., 2412 S. Seventh St., St. Louis 4. (DM;DMM)
Peerless Steel Equipment Co., Unruh & Hasbrook Ave., Philadelphia 11. (CM;CMP;DM;DMM)

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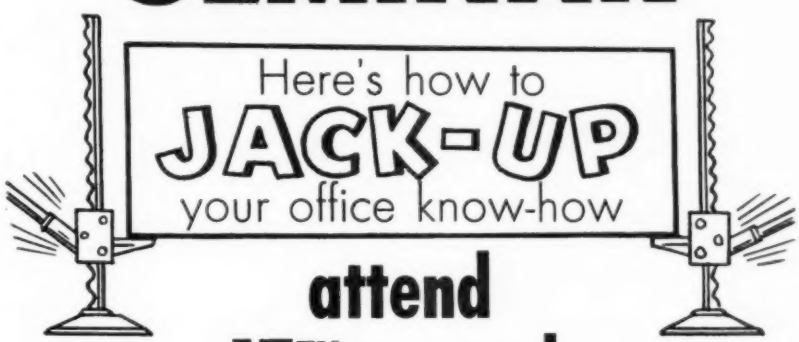

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Precision Mfg. Co., 831 Chicago Ave., Evanston, Ill. (CM;CMP)

Precision Metal Workers Corp., 3100 W. Carroll Ave., Chicago 41. (CM;CMP)

Remington Rand Div. of Sperry-Rand Corp., 315 Park Ave. South, New York 10. (CM;CMP;DM; DMM)

J. K. Rishel Wooden Library Furniture Co., 1201 W. Third St., Williamsport 19, Pa. (DW;DWM)

Riteform Chair Co., Inc., 301 Oak St., Quincy, Ill. (CM;CMP)

Rockwell-Barnes Co., 35 E. Wacker Drive, Chicago 2. (DM)

Royal Metal Mfg. Co., 1 Park Ave., New York 16. (CM;CMP)

Frank Scerbo & Sons, Inc., 140 Plymouth St., Brooklyn, N. Y. (CW;CWP;DW;DWM)

The Shaw-Walker Co., Muskegon, Mich. (CM;CMP;DM;DMM)

Shelbyville Desk Co., 403 S. Noble St., Shelbyville, Ind. (DW;DWM)

The Sikes Co., Inc., 20 Churchill St., Buffalo 7, N. Y. (CW;CWP)

Smith System Mfg. Co., 212 Ontario St., S.E., Minneapolis 14, Minn. (DM)

Standard Furniture Co., S. Washington St., Herkimer, N. Y. (CM; CMP ; CW ; CWP ; DMM ; DW; DWM)

Standard Pressed Steel—SEE Columbia Hallowell.

Stanley Mfg. Co., 2310 N. Main St., Fort Worth 6, Texas. (CW;CWP)

Steel Furniture Mfg. Co., 15531 Arrow Hwy., Baldwin Park, Cal. (DM;DMM)

Steelcase, Inc., 1120 E. 36th St., Grand Rapids, Mich. (CM;CMP; DM;DMM)

Stow & Davis Furniture Co., 23 Summer Ave. N.W., Grand Rapids, Mich. (CW;CWP;DW;DWM)

The Sturgis Posture Chair Co., 154 E. Erie St., Chicago 11. (CM; CMP)

Stylex Seating Co., 911 Walnut St., Philadelphia. (CM;CMP)

Tab Products Co., 995 Market St., San Francisco 3. (CMP)

The Taylor Chair Co., Bedford, Ohio. (CW;CWP)

Thomas Furniture Co., 420 Manning St., High Point, N. C. (CW)

The Toledo Metal Furniture Co., 1108 Hastings St., Toledo 7. (CM; CMP)

Tower Suites, Inc., 21 W. Illinois St., Chicago 10. (CW;DW)

Trent Furniture Co., Canton, Miss. (NI)

U. S. Chaircraft Mfg. Corp., 225 Belleville Ave., Bloomfield, N. J. (CM)

The Victor Safe & Equipment Co., Remington Rand Div. of Sperry-Rand, Inc., 315 Park Ave. South, New York 10. (DM)

Wassell Organization, Inc., Box 390, Westport, Conn. (CMP)

Welch Metal Products, Inc., 8557 San Fernando Dr., Sun Valley, Cal. (CMP)

Wells Chair Corp., P. O. Box 230, Michigan City, Ind. (CM;CMP)

Western Mfg. Co., 532 N. Highland Ave., Aurora, Ill. (DM)

Williams Office Furniture Co., 175 Fifth Ave., New York 10. (DM; DW; MI)

The Worden Co., 200 E. 17th St., Holland, Mich. (CW;CWP;DW; DWM)

The Wright Line, 160 Gold Star Blvd., Worcester 6, Mass. (CMP)

Yawman & Erbe Mfg. Co., 1099 Jay St., Rochester 3, N. Y. (DM; DMM)

Aged workers—

(From page 37)

to relieve unemployment. (On at least one occasion – in December, 1958, in Allenport, Pa.–such sentiments had more than theoretical meaning. One-hundred young furloughed employees of Pittsburgh Steel Co. picketed older workers with signs such as "Men over 65, please take your pensions. We have little mouths to feed," *and* "You raised your family. We still have ours to raise.")

Whose money is it?

So the trends are relatively clear. Management will have more older workers to contend with. Older workers have demonstrated their keen money-mindedness. They're moving into a position where, by one means or another, they'll get their way.

Where will the money come from? Whose money is it?

Two sources are obvious. Pensions and Social Security.

But even here, old concepts are changing–changing in a way that spells higher employment costs for

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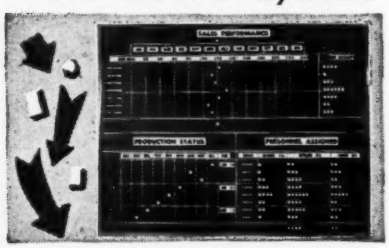

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Dismissing an older worker is never an easy task

management. And perhaps some loss of management prerogatives as well.

Retirement pay may come from pension funds – eventually – but in the meantime, these questions remain to be answered:

What are pension funds? And who owns them?

A recent volume, *Pension Funds and Economic Power*, has caused no small controversy in management circles because of its analytical but unorthodox answers to these questions. Written by Paul P. Harbrecht, S.J., and issued by the Twentieth Century Fund, the book asserts that the exact nature of pension funds remains an anomaly to management. No one knows exactly what they are or who owns them.

Father Harbrecht, a legalistically minded Jesuit, advances the idea that the funds are really deferred wages (a contention close to what some unions have held), and therefore employees have full vested rights in them. Employees, "co-determinately" with management–and not management alone–should have a voice in how these funds are invested, he says.

Pension Funds and Economic Power further charges that some pension agreements do not provide employees with all the security they think they are getting. "Escape clauses" enable employers to amend or terminate pension plans at will, and while the author does not condemn these clauses *per se*, he does suggest that workers be told about them frankly. All this may seem of small moment now, but it provides one more indication of how the aged–or a matter concerning the aged–will color management thinking in the future.

Social Security changes

Of much larger import now are proposed changes in Social Security regulations, such as those currently in the hands of the Senate Subcommittee on Problems of the Aged and Aging. One set of proposals, submitted last June by Dwight S. Sargent, personnel director of Consolidated Edison Co., New York, would permit people drawing benefits to earn more "on the side" without jeopardizing those benefits.

If the Sargent proposals became law, beneficiaries who earn more than the $1,200 allowed each year under present rules would not lose from $1.83 (if single) to $4 (if married with children) in benefits for each extra dollar they earn.

They would lose some benefits, but at the rate of 46 cents (if single) or 69 cents (if married) for each extra dollar over $1,200 that they make. In other words, the aged semi-retired worker would not be penalized for "extra" earnings, but would have some incentive to get them.

The case of the 1200th dollar

Some such proposal–if not precisely this – seems destined to become law in the sixties. Its implications for management are many. It would, first of all, increase the number of aged people knocking at its door for work. It would undoubtedly mean higher Social Security premiums (with management paying its proportionate share on each employee). But it would also eliminate the often erratic part-time hours of the aged, who steadfastly refuse to earn one cent more than the $1,200 now allowed them without penalty. (Cases of workers walking off a job at, say, 11:06 because that was the moment the 1200th dollar was earned are not uncommon.) And, surely, liberalized Social Security regulations would make it easier for companies to release the aged worker who, at 65, says he needs money.

Dismissing an older worker who is unwilling to go is never an easy task. It is tough to tell a veteran that for him, after all his years of service, it is all over. At a conference in New York recently, attended by many personnel supervisors, the problem brought forth many a heartfelt comment – and an occasional suggestion. (One outside observer remarked that many of the personnel executives seemed more intent on making the "parting scene" painless for themselves, rather than for the fellow who was being put to pasture.)

Some companies conduct pre-retirement programs with counseling on future plans, financial matters, hobbies, and the like beginning as

much as five years in advance. Some personnel directors feel companies have an obligation to counsel workers even after retirement—to keep in annual or semi-annual touch with them, to try to find jobs for them elsewhere. Exit interviews have become increasingly common as a means for understanding retiree problems.

Some supervisors try to ease out workers with repeated and not-too-veiled questions like "Well, Joe, don't you think the time has come?" Situations like this occur most often where retirement policies are fairly flexible—a trend likely to grow in the years ahead. It is true that mandatory retirement policies tend to make leave-taking an efficient, cut-and-dried affair. There are no ifs, ands or buts—at 65, or 68, you go, as you've known you would right along. (If you're an influential executive, you might work out a deal for remaining on a "consultant" basis.) But current personnel thinking weighs against mandatory policies. For a variety of reasons—from the simply altruistic to the soundly practical—management is gradually adopting flexible policies allowing workers to stay if they're able, or leave earlier if they wish.

The recalcitrant 5 per cent

There remains, however, a recalcitrant five per cent or so who won't go gracefully, regardless of policy. "You've done all you can to condition him," a personnel supervisor explained last month, "and still he can't see why he can't stay on. You try to reason tactfully with him some more—but finally you've got to practically carry him out. He's sore as hell. He goes home and writes a letter to the chairman of the board and says, 'I didn't retire! I was fired!' And in a way he was. It takes backbone to say 'no' to that five per cent!"

Saying "no" nicely is only one of many problems management faces as it comes to grips with the problem of the aged worker. As the force of that problem bears more heavily upon policy makers, other areas—some as yet only dimly seen—will take shape, create their flare-ups, and bring their remedies in turn.

In a word, the problem is new and it is large. Management must learn much, study much, plan much before it will adequately understand it all and live with it in harmony. Some of the Trends are clear; others have yet to be defined. The same with Forecasts: some things seem inevitable, and have provided the subjects of this article. Other forecasts—in what Dwight Sargent calls the three "problem areas" of fixed *vs.* flexible retirement, social security earnings, and "employment difficulties of men 45 and up"—need much more information before their future can sensibly be plotted.

Toward greater understanding

Sargent offers a series of questions (see below) as one way toward understanding the nature of these problems. His questionnaire is as concise a check-list as is currently available of the things management must ask itself as it leaves the wild age of Youth for a more mature, middle-aged—but no less vigorous—decade, the sixties.

Here is the Sargent questionnaire, with a few parenthetical comments, as presented last month at the National Committee on the Aging conference in New York:

1. Fixed vs. flexible retirement policies. (These questions can be used at exit interviews.)

a. What is the attitude of men 64 as to working or retiring?

b. What is the productivity of men 60-65? (Some studies indicate 45 per cent are "very good" production-wise at age 45; 20 per cent are "very good" at age 65.)

c. What is the rate of absence for sickness of men 60-65? (A definite negative factor—absenteeism does increase as a man gets older.)

d. To what extent does the size of a company pension that supplements Social Security affect the individual's decision to retire or continue working?

e. To what extent would the practice of giving men 65 lighter, easier jobs be welcomed and appreciated?

f. If "e" was done, how should the man's pay and pension be worked out?

g. How do companies which al-

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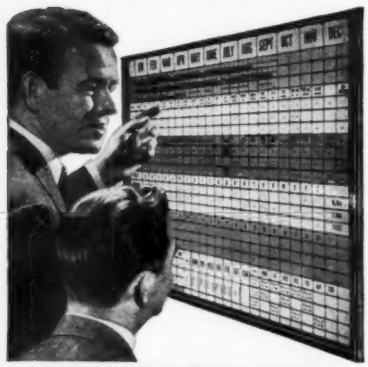

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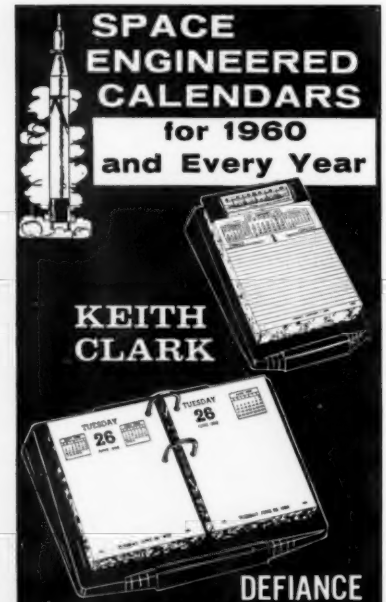

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low employees to work beyond 65 determine those who are not competent or satisfactory, and say "no" to them?

h. To what extent do private pension plans provide for disability retirement prior to age 65.

i. If a company pension plan does not have disability provisions, how are men handled who do become disabled prior to 65?

j. Does the work performance of women justify the fact that many plans provide for earlier retirement ages than provided for men?

k. Is there any evidence that the morale of men 60-65 is any better than that of younger men? (Yes, morale is better.)

l. To what extent would men who elect to continue working beyond 65 try to find other work if they had been retired at 65 on a compulsory basis?

m. Do the 70 to 75 per cent of individuals employed who are with companies which have no supplemental plan keep on working beyond 65 simply because they can't live on Social Security and need to continue working?

2. Social Security earnings limitation test.

a. How many men in 65-71 group are able to work, want to work, and would work more if rules were changed?

b. Same for women 62-71?

3. Employment difficulties of men 45 and up.

a. To what extent do pension costs go up when hiring men over 45? Need they necessarily go up?

b. To what extent do insurance costs go up? Need they necessarily go up?

c. To what extent is this a problem?

d. To what extent do union rules stop the employment of a man 45-65 in a level commensurate with his skill?

e. To what extent do "promotion from within" policies of employers diminish or eliminate possibilities for employment of individuals between 45-65?

Some of these points, of course, carry relatively less weight than others. Some, too, are answerable on the basis of common knowledge and observation. But few should be dismissed as not holding some clues to understanding that increasingly important fellow: the "aged" worker.

Build or buy?

(*From page* 61)

In another case, a move was made to a suburban area near a large city with good commuting facilities. This organization required a large unskilled female clerical force. After the move it found it could not attract enough high school graduates to fill the need. The gals would commute to the city for its "glamor" at much less take-home pay.

Among the problems of moving out of the city is employee feeding in a suburban area. Many companies which approached the problem with fear and trepidation found that a cafeteria, well run at a modest cost, could be a boon to employee morale. Conversely — nothing will tear down morale faster than poor handling of this fringe benefit.

Transportation is another bugaboo that frightens management contemplating a move. This too can be handled and turned into a morale booster. However, if neglected it can only prove to be a management headache.

No standard solutions

What is good for one company may be bad for another even if in a similar business in the same city. The flight from a congested area to a better business climate poses a major problem. Recently, we were commissioned to study two companies in Pittsburgh to determine whether they should move. These companies were of the same size, both owning their own buildings. Our recommendation to one was to move; to the other was to stay. One was dependent on a labor market not available at the proposed location.

With population pushing to the suburbs, and the shortage of urban office space, more and more companies will have to face this problem in the next decade.

In considering a move a total approach is needed. This means a careful analysis and evaluation arrived at in a completely objective manner, preferably by a qualified outsider.

Good judgment is the result of experience, experience is the result of poor judgment; so put the last decade's experience to good use in the next. To paraphrase an old saw, look before you lease, buy, or build.

Education for business: debate grows hotter

(*From page 34*)

undergraduate curriculum. This procedure has aroused mingled admiration and amusement among professional educators, some of whom feel that such obviously condensed courses are merely paying lip service to an ideal which cannot possibly be met by such predigested learning procedures. Others believe that even courses of this type, foreshortened though they must be, represent a realization by business that somewhere along the line it has missed the boat in its personnel emphases, and that, as an attempt to remedy this mistake, the courses are hopeful and helpful.

One of the companies that has had the longest experience in this field is the Bell Telephone Co. of Pennsylvania, which in 1953 organized the Institute for Humanistic Studies in cooperation with the University of Pennsylvania. The Bell system is one of the most elaborate and most widely respected business experiments in education, and escapes entirely the "quickie" charge leveled at so many of its successors. Promising Bell executives from all parts of the country are given ten months' leave of absence from their jobs—at full pay—to attend the Institute, where they study such a wide range of subjects as systematic logic, Oriental history and art, literature, and American civilization. The final four weeks of the program are devoted to a reading period in fields of the man's own choice.

Perhaps the most pertinent comment on the effect—and the success—of the first program at the Institute was offered by one of the original group of students at the conclusion of the course:

"Before this course I was like a straw floating with the current down the stream. The stream was

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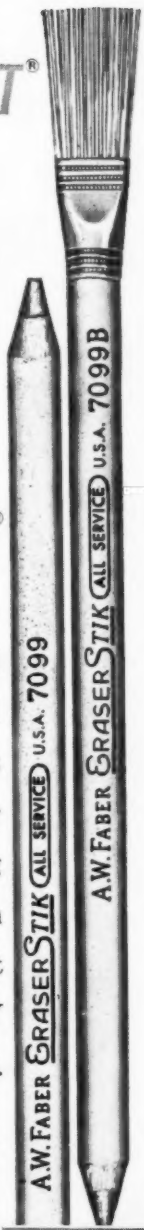

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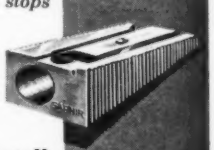

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the Bell Telephone Company. I don't think I will ever be like that straw again."

These second thoughts on the part of leading business concerns about the best qualifications for executives have become more and more prevalent through the latter years of the fifties. They are now being re-enforced by the current self-analysis of the business schools themselves, which, conscious of the sweeping changes affecting American business, are undergoing a critical review of their own educational emphases. Among the many things being considered: inclusion of more required liberal arts subjects in the school curriculum, reduction of the number of highly specialized courses (one school offers courses in Air Cargo Economics and Operations, and Retail Store Operation) to offer a few basic courses in broad business fields and make them really good.

Re-evaluation in the wind

So changes are in the wind heralding a re-evaluation, both by the schools themselves, and by business in general of the comparative value of general versus specialized education. Yet, the student anxious for a career in business is still finding that the campus recruiters who flood every college during the spring continue to give preference to business majors, even though the business schools in many universities admittedly are the weakest branches of the institution. What is the answer, and what is the outlook for the future?

A strong suggestion as to the cause of this apparent contradiction comes in a recent study sponsored by the Ford Foundation entitled "Higher Education for Business." Authors Robert Aaron Gordon and James Edwin Howell assert that while top management echelons are becoming increasingly aware of the dangers of depending exclusively on business schools even of the second rank, as a source for most of their executive recruitment, personnel departments may be concentrating still on finding people who can fit into a beginning job in the corporation as quickly and easily as possible. Therefore, college recruiters tend to emphasize the training most desired by middle management levels rather than the qualities and broad background which are felt most important at top management levels. In other words, the study indicates that too many college recruitment people and personnel departments are emphasizing immediate convenience at the expense of long range needs.

In any event, the impact of such studies as these, and the growing recognition of corporate management that the broad viewpoint, the wide range of knowledge of all fields, are desirable executive qualities, promises significant changes in the whole picture of education for business. And the changing character of the executive role will accelerate this pattern. To quote again from "Higher Education for Business;" the technological revolution in data processing and the new techniques being developed to provide a logical basis for decision-making could very well have these effects:

"1. The line between planning and performance will shift upward in the management hierarchy. The present trend toward decentralization will to some extent be reversed, and the amount of centralized planning and coordination will increase.

"2. In line with this, there will be an accelerating interest in research as companies seek to make the world in which they operate more predictable, and as they seek a more rational basis for decision-making. More specialized areas of research will develop in fields other than process and product development, utilizing mathematics, statistics, and the basic social science disciplines.

"3. More research, creative, and programming jobs will develop in the higher levels of management, and many lower and middle management positions will tend to take on more of a programmed character.

"4. More jobs will require creative and innovative abilities together with an understanding of the interactions between the firm and its environment.

"5. There will be some shift in concern with human relations from the supervisor-worker level to the top levels of management."

Every action stems from a sales order

(*From page 24*)

center" which would be devoted primarily to two functions: the receipt, sorting, and distribution of financial and production information by means of the wire network and associated facilities, and the processing of data by means of computing and related equipment. It thus worked primarily as a high speed clearing center for processing operating information needed by management, which remained at the corporate headquarters in New York.

Equally significant toward the end of the decade was the evolution by The Carborundum Company, Niagara Falls, N. Y., of what it called its "Total Systems Approach" to electronic data processing. Carborundum started with the assumption that "all operations in the typical manufacturing company are the result of a customer order." It then found, by tracing back all the papers generated in all the clerical work flow lines of the entire company, that every document and every action could be traced back to one of five types of original source data:

"1. The customer order—the beginning of everything.

"2. Manpower information — reflected in payroll source records.

"3. Materials, supplies, and services—as evidenced in purchase documents.

"4. Physical assets—shown by capital appropriations and related records.

"5. Master information records encompassed in customer files, product catalogs, price lists, discount tables, etc.—the fixed or static data used by the company in its work."

On the principles that all input information which is invariant should be correctly translated into machine language once, and only once, and that,

All input variable information should be captured, translated into machine language, and verified at its origin,

Carborundum developed an automation program in which sales order information was recorded in machine language at its source, the company's twelve district offices, transmitted over leased lines to the processing center at Niagara Falls, and there entered into computer processing. Within the computer at Niagara Falls there are four basic record files: Master Customer File, Master Product File, Finished Goods Inventory, and Orders in Process. Thus, the computer can handle all the far-flung ramifications of each incoming order from its effect on inventory levels to its eventual effect on production scheduling—a total systems approach to the entire company cycle of actions. In addition, the computer can produce the summary reports needed for management action and planning.

Although its comprehensive approach naturally took a long time to plan and put into full effect, Carborundum avoided the expensive mistake made by so many other companies before it. It knew it could not achieve all its goals at once, but it was also determined that it should have a completely integrated system rather than one in which the computer was used for only a few applications. It therefore classified all business data processing into two major categories: preparation of routine, operating records and reports, and preparation of management control information. Next the planners proceeded to map a system by which the first category could be completely mechanized, before an attempt was made to achieve the second goal. It then checked to insure that the computer would save the company money in terms of routine data processing alone. Only when it was assured that it would did Carborundum proceed.

The three events covered so briefly here represent in skeleton form the growth of the concept of automation throughout the decade just ended—a record of growth, of increasing sophistication in the meaning of automation and the abilities of the equipment offered by the manufacturers in the field, and a promise that automation truly offers what skeptics in the mid-fifties still doubted—a revolutionary new approach to total company activities, the end effects of which cannot even yet be foreseen.

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—now one upon a desk

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Portable—in 4 colors:

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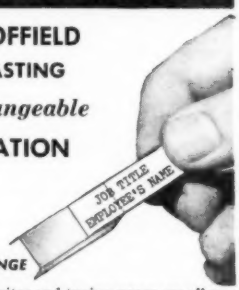

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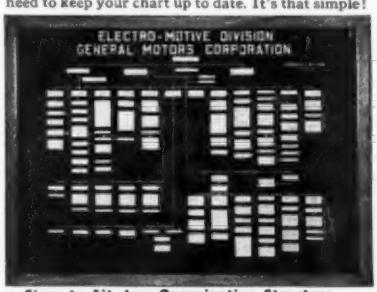

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MANAGEMENT CONTROL CHARTS CO.

1731 N. WELLS ST. CHICAGO 14, ILL.

Use Readers' Inquiry Coupon on Page 184

At last

FOR THOSE WHO MAKE AN OCCASIONAL MISTAKE

GENERAL'S *NEW*

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COLORED PENCILS

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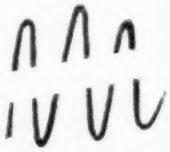

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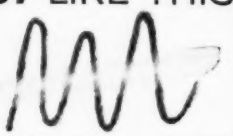

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No more messy, shredded papers! No more valuable working time lost fighting to erase colored pencil marks! With amazing, new ERASABLE Color-Tex — you can erase color as easily as you erase black lead pencil marks. Only the color comes off! No ghosts — no shredded paper!

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See for yourself how General's special "Carbo-Weld" process makes Color-Tex stronger and stay sharp longer! See how much faster your accountants, bookkeepers, secretaries work — once they're free from hard-to-erase, smudgy, colored pencils!

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Medium or Hard Grades with or without erasers

GENERAL PENCIL COMPANY

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Use Readers' Inquiry Coupon on Page 184

CLASSIFIED ADVERTISING

Rates: Minimum 20 words $5.00. Each additional word 25¢. Payable in advance. Address replies to all Box Number ads c/o OFFICE MANAGEMENT, 212 5th Ave., New York 10, N.Y.

For Sale Or To Buy

FOR SALE: BURROUGHS SENSIMATIC Bookkeeping Machine Series 300 and Cummins Perforator Model 321. Machines in excellent condition. Aluminum Shapes, 9000 River Road, Delair, N. J.

FOR SALE: TWO "NATIONAL" 142 Printers less than four years old in excellent condition. Will accept best offer. O.M. 330.

FOR SALE: 85 NATIONAL and Post Heavy Duty 11 x 17 Black Binders. Catalog #9588½ and #257-65. Good condition. Make offer. Office Manager, New Idea Division, AVCO Corporation, Coldwater, Ohio.

PHOTOSTAT MODEL JUNIOR COPIES subjects up to 14 x 18 inches. Excellent for blueprints. Milwaukee Gear Company, P.O. Box 3615, Milwaukee, Wisconsin.

SALE: FACTORY DEMONSTRATOR ELECTRIC 2 in 1 Folding and Letter Opening Machine. Fully guaranteed. Regular price $432.50, yours for $198.50. Lansdale Products, Box 568, Lansdale, Pa.

FOR SALE: MONROE BOOKKEEPING Machine #156662-209-235-191 complete with stand. O.M. 333.

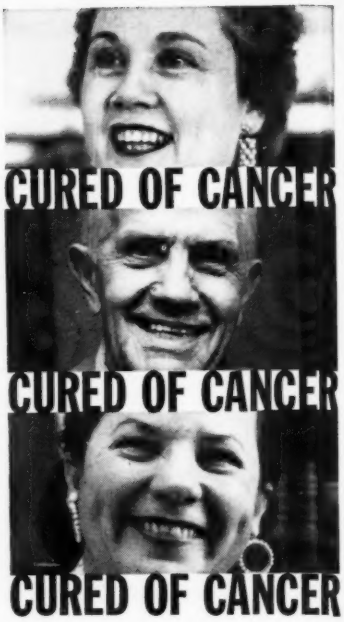
Positions Available

PROMINENT PHILADELPHIA PHARMACEUTICAL FIRM has an opening in its Systems Section for a Business Forms Designer. Drafting training required and an understanding of forms design preferred. Excellent career opportunity. Send salary requirements, age and sample drawings along with resume to: Smith Kline and French Laboratories, c/o Personnel Department, 1500 Spring Garden Street, Philadelphia 1, Penn.

SYSTEMS SPECIALIST NATIONALLY KNOWN management consulting organization needs man with BBA or BS in accounting to work with clients throughout U.S.A. and Canada. Minimum of 3 years experience in public utility accounting and/or systems methods and procedures required. Send resume and salary requirements in first letter. Replies confidential. O.M. 329.

Business Opportunities

REDUCE TURNOVER, LOWER TRAINING costs by testing job applicants. No client too large or too small. Details free. Guidance Associates, Haypath Road, Plainview 15, New York. Established 1938.



There are a million of them! Untold numbers of these men and women actually owe their lives to information they obtained from the American Cancer Society.

Fighting cancer is our business. We have all kinds of ammunition: posters; exhibits; film strips; easy-to-understand folders; hard-hitting, dramatic films.

They're free for use in your office, your club, at your PTA meeting, your church socials, your community center. They're all designed to alert you, your family and your friends to facts about cancer which can mean the difference between life and death.

Call or write the Unit of the American Cancer Society nearest you. It's stocked with ammunition that could save *your* life.

AMERICAN CANCER SOCIETY

Automation in the sixties—

(*From page 52*)

Overage and shortage flashers resulting from changing inventory balances.

Inquiry replies to all users of the computer.

Shipping cards or documents and back-order notifications.

Complete dollar value summaries of transactions and inventories.

Printer-ready catalog copies.

Contract status reports.

Main gain to the Army from the new system, which was put into complete operation just last month, is a reduction in the time needed to receive a "customer" order, process it, put it through a depot, and get the requested material on its way. Total time required has been reduced from about 15 days to 72 hours. This in turn means that both Army bases and depots can work with much smaller inventories than they have in the past, and thus run much less danger of being caught with large stocks of obsolescent equipment. These factors alone are expected to save the army at least $6,000,000 a year.

Stock levels kept by computor

However, think of what this one system means in terms of personnel staffing requirements. No longer are any Army depots or warehouses responsible for records of their inventory quantities. The computer holds their stock levels for all items in its records; the local installation is responsible only for the location of the items it holds in its inventory: it does not need to keep any records whatever of quantities.

Now, granted that the main economic gain of this system, which would work equally well as an inventory control procedure for any giant manufacturing group which needed to hold large and varied part stocks in different locations through the country, comes through lowered inventories, visualize for a moment the clerical jobs that are eliminated by this centralization of the record keeping function. The clerks formerly needed to record stock levels in the depots are no longer needed; the number of clerical workers needed at the central installation is lessened.

Reassignment—yes, that offers some solutions. But can it always be done, in every instance of workers displaced by automation? Obviously not. And, even though a company planning automation has the time to shift its workers, to cut down on its new hires, to counsel and help the workers who will probably have to be released, clerical workers as a whole will feel their welfare and their jobs threatened. This may be the major management job in the ten years ahead—convincing workers that automation with all its implications does not mean violent upheaval but rather a transition period in which the eventual results will be more and better jobs for everyone.

CONVENIENCE *Plus...*

with these top-quality

Weldon Roberts Erasers

Pull the String and you "Point" these Erasers!

TOP FLIGHT TEXTURES . . .
erase pencil, ink, ball point, typewriting, business machine writing....

TIME-SAVING "POINTING"
right at office workers' desks

The handy, pencil-size eraser sticks are cased in spiral-wound paper. *Pull the wrapped-in string. Paper spiral unwinds. Eraser is "pointed"!*

♦ **No. 448 GREEN GLOW**
(Soft green rubber.) Erases pencil. Also removes surface carbon from carbon ribbon impressions. *and . . .*

♦ **No. 378 GRAYPOINT**
(Business-like gray rubber), removes the final image. Erases ink, typewriting and business machine writing, too.

♦ **No. 138 BALL POINT**
(New formula green rubber.) Particularly developed to erase ball point ink and lead.

No. 258 INDIA INK
(Fine green rubber.) For erasing India Ink and work from opaque pencils 2H and harder.

SAVE WORKERS' TIME AND TEMPERS!

Order a Supply of
WELDON ROBERTS PAPER-WRAPPED ERASERS TODAY FROM YOUR STATIONER!

WELDON ROBERTS RUBBER CO.
365 Sixth Avenue
Newark 7, N. J.
World's Foremost Eraser Specialists

Weldon Roberts Erasers
Correct Mistakes in Any Language

Use Readers' Inquiry Coupon on Page 184

FREE
INQUIRY SERVICE
For Subscribers

Get More Information
Quickly — Easily — on New Products

Obtain New Catalogs
and Helpful Literature

This service is provided for the convenience of Office Management Executives in obtaining complete information on the products advertised in this issue. Advertisements are identified by their respective page numbers. Fractional page advertisements are further identified by the initials of the advertiser.

Just circle the numbers in the coupon, fill in your name and address, tear out and mail to Office Management. Your inquiries will be forwarded promptly to the companies concerned.

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January 1960
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Editorial

IT'S UP TO US

ADLAI Stevenson recently predicted that the 1960's would prove as fateful a ten-year period in our history as were the years between 1860 and 1870, when the nation was torn by its most bitter struggle. That struggle basically determined the future of America, by ensuring our development as a great industrial power rather than an agricultural nation.

Today, thankfully, we are in a cold war abroad rather than a savage one at home. The pressures are external rather than internal. But the competition between the two systems — ours and our opponent's — is no less real than the conflicts that exploded at Sumter and Vicksburg and Antietam.

Our rival has told us that his country "will bury us" — that the "inherent weaknesses" of the capitalistic system make it inevitable that Communism will conquer it economically. The challenge he poses is an economic and industrial one, and the battlefield is the world.

That means that it is we — the managers of American business, and our counterparts in the free nations overseas, who must answer the challenge, rather than the military or even the government. The degree of success with which we tighten our businesses, expand our production, build a stronger, more vital and faster growing economy, will determine how well we meet the challenge.

And, within the terms of our system, it is primarily the office and those who manage it that will determine the success of the economy's response to Communism's gauntlet. We cannot, without losing the battle in advance, achieve a vast increase in output by directives, by deliberately sacrificing one category of goods for another under the direction of a central planning authority. The essence of our system is successful management and intelligent planning within the individual company, rather than directions imposed from above on that company. And today, there is neither room nor time for the casual methods, the divided responsibilities, the intuitive planning of the past. Companies must be mobile, responsive to shifting situations and needs. They must operate with a shorter lead time, lower inventories, better control in every way over unit costs.

And the basis of both planning and control is information — the office's product.

Thus, the essential link, the directing center which can make the whole economy more productive in terms of making every company more efficient, or which, alternatively, can let it rock along in old, comfortable — and inadequate — routines, is the office, and the people who staff and manage it.

It's up to us.